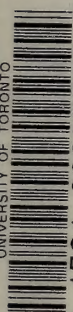



UNIVERSITY OF TORONTO



3 1761 00827247 8



Digitized by the Internet Archive
in 2017 with funding from
University of Toronto

4282
A
VOLUME VI

December 25th, 1916

臺灣植物圖譜

臺灣植物誌料

第六卷

Icones Plantarum Formosanarum

nec non et

Contributiones ad Floram Formosanam

or

Icones of the Plants of Formosa, and Materials for a Flora of the
Island, based on a Study of the Collections of the Botanical
Survey of the Government of Formosa

By

Bunzō Hayata, *Rigakuhakushi*

VOLUME VI 57

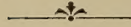
THE ROYAL CANADIAN INSTITUTE

Published by the Bureau of Productive Industries,

Government of Formosa

TAIHOKU

NOTICE



- I. Dicotyledons—Polypetalous: Ranunculaceæ—Rosaceæ. Published September 10th, 1911.
- II. 1. Conspectus of the Flora of Formosa, Saxifrageæ—Dipsaceæ.
2. New or Noteworthy Plants of Formosa. Published October 15th, 1912.
- III. 1. Contributions to the Flora of Formosa, I.
2. On the Systematic Position of *Mitrastemon*, as a Genus representing a special Tribus of the Rafflesiaceæ. Published December 25th, 1914.
- IV. Contributions to the Flora of Formosa, II. Published November 25th, 1914.
- V. Contributions to the Flora of Formosa, III. Published November 25th, 1915.
- VI. Contributions to the Flora of Formosa, IV. Published November 25th, 1916.
- VII. Will be issued in September 1917.



ICONES PLANTARUM FORMOSANARUM

NEC NON ET

**CONTRIBUTIONES AD FLORAM
FORMOSANAM**

VI

AUCTORE

Bunzo Hayata

QK

369

H₃

v. 6-7

TO HIS EXCELLENCY BARON TEIBI ANDO,

GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the sixth volume of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

September 1, 1916, Taihoku.

INTRODUCTION.

As was announced in the introduction of third volume of this work, the present volume is principally devoted to the fourth part of those studies which have for the most part been upon new material, collected since 1912.

The volume contains studies on 212 species and 6 varieties ranging from the Berberideæ down to the Polypodiaceæ. All the species of phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 126 are proposed as new species and 6 are regarded as new varieties of known species, while 86 are identified with species which were already known as from Formosa or from other countries. One genus, *Parasitipomaea*, is proposed as a new, while 9 genera are mentioned as new to the flora of the island. The latter genera are as follows:

<i>Nuphar</i>	<i>Gardneria</i>	<i>Myrmechis</i>
<i>Picrasma</i>	<i>Acanthephippium</i>	<i>Gymnadenia</i>
<i>Gerbera</i>	<i>Vrydagzynthia</i>	<i>Woodsia</i>

Species,* genera* and families* now to be added to the flora of Formosa number as many as 121 species and 10 genera. Thus, up to the present date, the total number of species of the flora, so far as known, is 3446 species belonging to 954 genera and 160 families.

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

December 1916, Taihoku and Tōkyō.

* It should be understood that plants outside of the island are not counted in this number, although they are mentioned in this volume.

CONTENTS.

Introduction.....	I.
Contributions to the Flora of Formosa IV.	1-163.
Index.....	164-168.
Plates	I-XX.

Contributions to the Flora of Formosa.

IV.

Berberideæ.

Mahonia NUTT.

Mahonia oiwakensis HAYATA sp. nov. Arborescens circ. 10 m. alta. Rami recti teretes apicem versus 1 cm. in diametro sectionis, cortice cinereo suberiformi, cicatricibus foliorum elevatis linearibus transverse dispositis. Folia versus apicem ramulorum approximativissime disposita radiatim divaricata pinnata in ambitu obovato-oblanccolata vel oblanccolata 25–40 cm. longa 10–20 cm. lata subsessilia supra medio latissima inferiore in ambitu gradatim usque ad basin attenuata, pinnis 12–14-jugis oppositis vel superiore subalternis, jugis inferioribus quam iis superioribus remotioribus, pinnis infimis ovatis $1\frac{1}{2}$ – $2\frac{1}{2}$ cm. longis 7–15 mm. latis margine 1–2-aristato-dentatis, pinnis superioribus gradatim majoribus angustioribus longioribus; pinnis longissimis lanceolatis 8–10 cm. longis 14–20 mm. latis apice acuminatissimis basi cordato-rotundatis plus minus obliquis sessilibus margine tenuiter leviterque 1–3 dentibus instructis, dentibus interdum ad aristam $\frac{1}{2}$ mm. longam reductis, aristis ascendentibus, coriaceis supra nitidis subtus pallidis, costa supra tenuiter impressa subtus elevata, nervis lateralibus supra haud distinctis vel vix elevatis subtus tenuiter elevatis, 5-nerviis utroque glabris; nodis jugarum leviter tumidis articulatis, rhachibus supra subtusque planis latere profunde sulcatis; jugis inferioribus a se $2\frac{1}{2}$ –4 cm. remotis; rhachibus ad basin subito valde dilatatis 8–10 mm. latis; pinna terminalis quam pinnis lateralibus longior longissima linearis vel lineari-lanceolata integra vel dentibus 1–2 instructa. Racemi floriferi non visi; fructiferi ad apicem ramorum dense congesti erecti recti 9 cm. longi, bracteis oblongo-triangularibus $3\frac{1}{2}$ mm. longis 2 mm. latis apice acutis basi leviter ventricosus patentissimis, pedicellis brevissimis 2 mm. longis. Bacca purpureo-nigricans glaucescens conico-ovoidea 9 mm. longa 6 mm. lata apice oblique acuta breve attenuata reliquis stigmatis apiculata 2-sperma. Semina ellipsoidea $4\frac{1}{2}$ mm. longa $2\frac{1}{2}$ mm. lata utrinque obtusa, testa nigricanti.

HAB. Musha Oiwake, leg. B. HAYATA, Mai. 1916; Gōkwanzan, leg. U. MORI, Feb. 1910.

Near *M. lomariifolia* TAK., but differs from it in the much narrower leaflets which are less spinous at the margin and have the less elevated veinlets.

Nymphæaceæ.

Nuphar SM.

Nuphar Shimadai HAYATA sp. nov. (Pl. I.) Herba aquatica; rhizoma crassum repens subteres 1 cm. in diametro sectionis sursum radiferum, radicibus teretibus incrassatis 3 mm. in diametro sectionis. Folia circum rhizoma spiraliter disposita longe petiolata, lamina in ambitu oblonga vel ovata (ab apicem laminae usque ad apicem auriculæ) 8–10 cm. longa 7–8 cm. lata apice perfecte rotundata basi sagittato-cordata (lobis cordis subtriangularibus 3–4 cm. longis apice obtusissimis) margine subintegra supra in exsicco minute muricato-scabriuscula glabra subtus versus medium paucè versus marginem densissime hirsuta, costis supra haud visis subtus leviter elevatis, venis lateralibus radiatim divaricatis supra haud subtus distincte visis tenuissimis, subcoriacea, petiolis 15–30 cm. longis basi dilatatis. Scapus 25–40 cm. longus teres 3–3½ mm. in diametro sectionis erectus. Flores flavi solitarii terminales. Sepala 5 obovata vel spathulato-obovata plus minus inaequalia (majora 2 cm. longa 13 mm. lata apice late rotundata vel emarginata basi angustata ad insertionem 3 mm. lata vel latiora, exteriora minora plus crassa interiora majora tenuissime membranacea. Petala ∞ breviora staminodiiformia 6 mm. longa 2½–3 mm. lata dorso complanata obovato-quadrangulariformia apice truncata vel emarginata. Stamina ∞ cum antheris 1 cm. longa, filamentis dorso complanatis 8 mm. longis 1 mm. latis glabris, antheris quadrangulari-formibus 2½ mm. longis 1½ mm. latis apice truncatis, loculis 2 linearibus introrsis a se ⅔ mm. distantibus. Ovarium semi-rotundato-coniforme 3–4 mm. longum 7 mm. latum glabrum apice ad stylum 1–2 mm. longum abeuns, stylo apice 10-fido, segmentis 2 mm. longis exteriore recurvis apice acutis facie interiore prominente 1-carinatis ad carinas stigmatosis. Bacca late globosa 17 mm. longa 20 mm. lata apice stigmate coronata. Semina globoso-ovoidea 4 mm. longa 3 mm. lata apice obtusa basi rotundata, testa crustacea fusco-castanea; albumen osseum succineum semipellucidum. Embryo teres centralis.

HAB. Shiuchikuchō: Shimpō, leg. Y. SHIMADA, Dec. 1915. (Fl. et fr.)

Very near *Nuphar nipponicum* MAKINO, but differs from it in having more rounded leaves which are much hirsute on the under surface.

Violaceæ.

Viola LINN.

Viola Tayemonii HAYATA sp. nov. Caulis cum flore terminali circ. 8 cm. longus simplex haud ramosus glaber erectus. Folia radicalia ignota. Folia caulina 2 alternatim sita glabra petiolata late reniformia 18 mm. lata 8 mm. longa apice late rotundata vel plus minus acuta basi profunde reniformia margine serrulata, (serrulis ascendentibus recurvis latere inferiore 2 mm. longis latere superiore $\frac{1}{3}$ mm. longis apice glanduliferis, glandulis rubris), utraque pagine atro-viridissima, supra venis venulis decoloratis distincte visis, supra hirsuta subtus glabra, petiolis 1–1½ cm. longis glabris, stipulis lineari-oblongis glabris supra hirsutis subtus glabris 4–6 mm. longis 1½–2 mm. latis. Flores flavi terminales pedunculati, pedunculis 3 cm. longis glabris erectis. Sepala oblongo-linearum 4½ mm. longa 1¼ mm. lata apice obtusa integra margine ciliolata pagine utraque subglabra; petala et stamina ignota.

HAB. Taihasenzan, ad 11000 ped. alt., leg. Tayemon Itō, Jun. 1915.

Near *Viola biflora* LINN. var. *crassifolia* MAKINO, but differs from it in having much smaller leaves and flowers.

Viola senzaensis HAYATA sp. nov. Rhizoma erectum. Folia omnia radicalia longe petiolata utraque glabra triangulari-cordata 8 mm. longa 10 mm. lata apice triangulari-obtusa basi reniforme cordata margine remote serrulata, (serrulis a se 2 mm. remotis brevissimis latere superiore $\frac{1}{4}$ mm. longis latere inferiore 2 mm. longis apice callo uno rubro instructis), supra viridia venis venulis haud visis, petiolis 2–3 cm. longis glabris, stipulis lineari-lanceolatis 2–3 mm. longis 1 mm. latis paucissime laciniato-serratis vel integris. Scapus 3 cm. longus glaber medio bracteis singulis vel duabus instructus, bracteis linearibus 2 mm. longis acuminatis. Flores 7 mm. longi. Sepala lineari-lanceolata. Antheræ lineari-oblongæ 1 mm. longæ $\frac{2}{3}$ mm. latæ subsessiles, appendiculis connectivorum ovatis 1½ mm. longis 1 mm. latis apice obtusis basi subtruncatis rubescentibus membranaceis. Cæterum ignoti.

HAB. Taihasenzan, ad 11000 ped. alt., leg. TAYEMON ITŌ, Jun. 1915.

Remarkable for the very small leaves.

Ternstroemiaceæ.

Adinandra JACK.

Adinandra lasiostyla HAYATA Mater. Fl. Formos. p. 42. Descriptio aucta:—Flores axillares solitarii, pedicellis 1 cm. longis villosis basi bracteis 2 instructis, bracteis minutis caducis oblongo-triangularibus $1\frac{1}{2}$ mm. longis $\frac{5}{4}$ mm. latis apice obtusis extus pilosis intus glabris. Sepala 5 rotundato-ovata $4\frac{1}{2}$ mm. longa 4 mm. lata apice obtusissima basi haud vel vix contracta margine dense ciliolata dorso prope medium pilosa crassiuscula versus marginem glabra intus glabra imbricata. Petala 5 imbricata ovato-rotundata 4 mm. longa totiusque lata apice triangulari-obtusa basi plus minus contracta margine crenulato-denticulata dorso medio crassiuscula pilosa versus marginem tenuia glabra intus toto glabra. Stamina circ. 20, filamentis $\frac{1}{2}$ mm. longis glabris complanatis antheris lineari-lanceolatis 2 mm. longis $\frac{1}{2}$ mm. latis apice acuminatis basi obtusi, extus plus dense intus minus dense pilosis, pilis 1 mm. longis ascendente-erectis, loculis 2 introrsum dehiscentibus. Ovarium pilosum cum stylo conico-columniforme cum stylo 3 mm. longum $\frac{3}{4}$ mm. latum basi densissime sursum sparse pilosum, stylo $1\frac{1}{2}$ mm. longo glabro apice brevissime 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 1055).

This form is distinguishable from the type in having quite glabrous styles. It may be questioned, however, that this form is a male one of the original.

Geraniaceæ.

Impatiens LINN.

Impatiens Tayemonii HAYATA sp. nov. Caulis erectus rectus glaber 40 cm. altus. Folia alterna membranacea oblonga circ. 10 cm. longa $4\frac{1}{4}$ cm. lata apice acuminata basi cuneato-obtusa margine serrata, serris ascendentibus 3-4 mm. latis totiusque longis apice truncatis et emarginatis ad centrum apiculatis, apiculis $\frac{1}{2}$ mm. longis erectis rectis, venis lateralibus ad apicem serrularum haud attingentibus, utraque glabra, petiolis 1-2 mm. longis, stipulis nullis. Flores majusculi flavi ad axillas foliorum superiorum solitarii, pedunculis

gracilibus $2\frac{1}{2}$ cm. longis versus apicem 1-bracteatis, bracteis minutis. Sepala 3; lateralia 2 ovato-rotundata 1 cm. longa 8 mm. lata apice recurvo-apiculata basi rotundata; posticum 1 longe saccatum apice ad orem cuspidato-acutum, ore plus minus obliquo 18 mm. in diametro, sacco obconico 2 cm. longo (calcare excepto) $1\frac{1}{2}$ cm. lato basi acuto ad calcare lineare abeunti, calcare ascendento-recurvo lineari 8 mm. longo 1 mm. lato ad extremitatem 2-fido, ramis 2 mm. longis. Petala 3: vexillum in plicato 8 mm. latum in explicato 16 mm. latum 6 mm. longum (in plicato oblique semi-rotundatum) apice emarginatum apiculatum, apiculis 1 mm. longis deorsum productis; alæ semi-oblongæ 2 cm. longæ 1 cm. latæ latere posteriore (superiore) lobis singulis instructæ, lobis 4 mm. longis 5 mm. latis semi-rotundatis acutis apiculatis, apiculis 2 mm. longis deorsum recurvis. Stamina 5, filamentis complanatis 3 mm. longis medio appendiculatis, appendiculis linearibus $1\frac{1}{2}$ mm. longis, antheris circum pistillum cohærentibus late rotundatis. Ovarium lineare cum stylo brevissimo 4 mm. longum $1\frac{1}{2}$ mm. latum apice cum stylo obtusum 5-costatum.

HAB. Taihasenzan, ad 7000 ped. alt., leg. TAYEMON ITÔ, Junio 1915.

Near *I. Noli-tangere* LINN., but differs from it in having more minutely serrate leaves tipped with a small tail.

Rutaceæ.

Evodia FORST.

Evodia hirsutifolia HAYATA sp. nov. Frutex? Ramuli fusco-purpurascens. Folia opposita in ambitu lanceolata generaliter 9-11-foliolata, foliolo terminali maximo elongato-oblongo 10 cm. longo $3\frac{1}{2}$ cm. lato apice acuminato basi acuminato membranaceo-chartaceo margine integro utraque pagine tenuiter brevissime hirsuto, costa supra subtusque tenuiter elevata, venis lateralibus primariis utraque pagine tenuiter elevatis hirsutis utroque latere costæ 15-18 subrectis angulo obtusissimo a costa divaricatis, in exsiccato supra fuscenti subtus pallido subtus minute pauce rufo-fusco-punctato, petiolulo terminali 13 mm. longo; foliolis lateralibus oppositis ovatis vel ovato-lanceolatis inferioribus gradatim minoribus, infimis minimis basi plus minus obliquis, superioribus subsessilibus, inferioribus breve petiolulatis, petiolis communibus 3-4 cm. longis cum rhachibus haud alatis brevissime hirsutis. Cymæ axillares

vel terminales, fructiferae cum pedunculis 6 cm. longæ 8-9 cm. latæ, ramis oppositis transverse divaricatis; pedunculis $2\frac{1}{2}$ cm. longis hirsutis. Fructus folliculifer 6 mm. longus 11 mm. in diametro generaliter 5-carpellaris, carpellis basi connatis obovatis apice rotundatis basi acutis dorso rotundato-convexis latere planis latere leviter compressis dorso grosse tuberculatis latere lævibus. Semina ellipsoidea $3\frac{1}{2}$ mm. longa 3 mm. lata nitida nigerrima.

HAB. Rinkiho, leg. H. INABA, 1911, Aug.

Near *Evodia meliæfolia* BENTH., but differs from it in having thinly hairy leaves and cymes.

Evodia meliæfolia BENTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 69. Frutex. Ramuli fuscentes lenticellis elevatis rotundatis minutis notati. Folia opposita in ambitu lanceolata vel ovata cum petiolis 10-20 cm. longa 9-12 cm. lata 5-11-foliolata, foliolis subæqualibus, foliolo terminali ovato-lanceolato $5\frac{1}{2}$ cm. longo $2\frac{1}{2}$ cm. lato apice caudato-acuminato basi obtuso æquali vel plus minus obliquo ad summum obtuso margine subintegro supra in exsiccato fuscenti subtus plus minus albicanti, costa supra tenuiter subtus distincte elevata, venis lateralibus tenuissimis, petiolulo circ. 1 cm. longo; foliolis lateralibus oppositis ovato-lanceolatis basi valde obliquis latere superiore 12 mm. lato latere inferiore 8 mm. lato, petiolulis 8 mm. longis; petiolis communibus 4 cm. longis. Flores non visi. Cymæ ad axillas foliorum superiorum vel terminales cum pedunculis $5\frac{1}{2}$ cm. longæ totiusque latæ trichotome ramosæ dense fructiferae, pedunculis 3 cm. longis. Fructus folliculiformis depressus 3 mm. longus 7 mm. in diametro 3-5-carpellaris, carpellis subdistinctis subglobosis latere compressis dorso rugosissimis latere sublævibus sutura ventrali dehiscentibus, endocarpiis et exocarpiis demum solutis, endocarpiis cartilagineis. Semina ellipsoidea $2\frac{1}{2}$ mm. longa 2 mm. lata apice obtusa basi rotundata latere uno cicatricibus linearibus hilorum notata, testa osseo-crustacea nitidissima nigerrima; albumen carnosum; embryo amplus, cotyledonibus rotundato-ellipticis $1\frac{1}{2}$ mm. longis, radicula brevissima $\frac{1}{2}$ mm. longa.

HAB. in monte centralibus (Ahisen), ad 4000 ped. alt., leg. S. SASAKI, Jan. 1911.

Zanthoxylum LINN.

Zanthoxylum liukiense HAYATA sp. nov. Frutex. Ramuli teretes

haud aculeati, cortice longitudinaliter ruguloso ad rugulos fisso haud vel vix lenticellato glabro. Folia alterna pari- vel impari-pinnata tenuiter coriacea in ambitu linearia cum petiolis 20 cm. longa 6 cm. lata 19–23-foliolata, foliolis superioribus majoribus inferioribus minoribus; foliolo terminali oblongo-lanceolato 4–4½ cm. longo 1½ cm. lato apice caudato-acuminato ad summum obtuso retuso basi acuto margine crenulato utraque pagine glabro, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra haud subtus tenuiter elevatis utroque latere costæ 7–8 subrectis, utraque glabro obscure minute punctato; foliolis lateralibus ovato-oblongis apice breve caudatis basi obliquis latere superiore obtusis vel rotundatis latere inferiore acutis vel obtusis a se 1½ cm. remotis; rhachibus angustissime alatis semi-teretibus, petiolis communibus 2 cm. longis glabris. Paniculæ axillares 4 cm. longæ 3 cm. latæ, ramis divaricatis glabris apice flores subglomeratim gerentibus (pedicellis ultimis 1–2 mm. longis crassis basi bracteis minutis triangularibus acutis ¼ mm. longis instructis). Flores ♀: sepala 4 triangularia apice obtusa basi haud contracta minus quam 1 mm. longa totiusque lata sub microscopio margine ciliolata utraque pagine glabra crassiuscula. Staminodia 4 triangulari-linearia ⅔ mm. longa ¼ mm. lata haud antherifera. Ovarium tetramerum 1 mm. altum glabrum, carpellis subdistinctis octantiformibus, stylis 2 mm. longis validiusculis exteriore recurvis apice oblique stigmatiferis. Discus sub ovario insitus incrassatus 1 mm. longus totiusque latus.

HAB. Loo-choo, Nagodake, leg. G. NAKAHARA, Aprili. 1907.

Near *Z. cuspidatum* CHAMP., but distinguishable from it by the much more numerous and smaller leaflets and much shorter common petioles.

Zanthoxylum acanthophyllum HAYATA sp. nov. Frutex? ramossissimus; rami teretes glabri fulvo-cinerascentes, cortice tenuiter ruguloso lenticellis haud elevatis minutis albis hac atque illac notato; ramuli flexuosi alternatim foliati, utroque latere basis petiolorum spinis oppositis instructi, (spinis validissimis oppositis latere complanatis facie exteriore planis facie interiore subangulatis in sectione apice subulato-acutis basi triangulari-dilatatis circ. 1 cm. longis basi 6 mm. latis rectis a ramulo angulo circ. 90° egressis basi deorsum fulvescentibus sursum rubro-purpurascentibus nitidis). Folia rami annotini decidua majora 7-foliolata ambitu obovato-

oblonga vel oblonga cum petiolis 10 cm. longa 7 cm. lata, foliolo terminali obovato oblongo vel oblongo 5 cm. longo 2 cm. lato apice obtuso vel acuto basi obtuso vel cuneato basi integro excepto brevissime serrulato versus apicem crenulato, ad marginem tenuissime deorsum recurvo, pagine superiore glabro sed setulis 1 mm. longis ascendentibus consperso ad costas et venas haud setuloso, pagine inferiore glabro haud setuloso sed ad costas setuloso, costis et venis supra tenuissime impressis subtus elevatis, venis lateralibus primariis utroque latere costæ 5-6 mediis a costa angulo 50° egressis subrectis ad marginem haud attingentibus, membranaceo vel chartaceo; foliolis lateralibus oppositis 3-jugis, jugis superrimis maximis quam foliolo terminali majoribus, jugis infimis minoribus, petiolis cum rhachibus a basi usque ad foliolum terminale $5\frac{1}{2}$ cm. longis a latere complanatis supra late canaliculatis utroque latere canaliculorum angustissime elevato-alatis subuts minute setulosis, supra ad jugas superiores inter foliola lateralialia seta validiuscula 5 mm. longa singula instructis, ad jugam infimam setula minuta singula instructis; inter-jugis 14 mm. longis, cum petiolulo terminali (i. e. partibus rachis inter foliolum terminale et jugam superrimam) æquilongis; foliis ramulorum lateralium floriferorum hornotinorum minoribus cum petiolo 3 cm. longis 2 cm. latis. Flores ♂ cymosi. Cymæ ad apicem ramulorum lateralium terminales subumbelliformes sessiles, ramis (vel radiis) 5-6, $1\frac{1}{2}$ cm. longis glabris patentibus apice florem 5-6 umbellatim gerentibus, pedicellis ultimis 3 mm. longis basi articulatim deciduis basi bracteis singulis instructis, bracteis minutis subuliformibus 1 mm. longis. Sepala 5 inæqualia lanceolata vel lanceolato-triangularia 1 mm. longa apice lineari-acuminata basi $\frac{1}{3}$ mm. lata glabra. Petala 0. Stamina 4-5 sepalis opposita, filamentis $1\frac{1}{2}$ mm. longis $\frac{1}{8}$ mm. latis glabris, antheris apertientibus reniformibus in clauso ellipticis $\frac{3}{4}$ mm. longis glabris apice emarginatis dorso apice globulis singulis instructis, globulis nigro-coloratis. Rudimentum ovarii (vel discus?) globoso-pulviniforme $\frac{2}{3}$ mm. longum $\frac{3}{4}$ mm. latum apice apiculis brevibus instructum. Fl. ♀ ignoti.

HAB. Takao, leg. S. SASAKI, Mart. 1910.

***Fagara* LINN.**

***Fagara cyrtorhachia* HAYATA** sp. nov. Frutex scandentissimus. Rami subrecti remotissime aculeolati, aculeis 4 mm. longis latere complanatis descen-

dento-recurvis, remote foliati, corticein exsiccatō fusco-cinerascenti longitudinaliter ruguloso minutissime lenticellato. Folia 7-17-foliolata in ambitu lanceolata, foliolis oblongis vel lanceolatis lateralibus suboppositis vel alternis, infimis longissimis oblongo-ovatis 5 cm. longis 2 cm. latis apice acuminato-caudatis (ad summum caudæ obtusis) basi cuneato-acutis margine integris in exsiccatō supra subnitidis vel opacis fuscentibus subtus pallidioribus utroque glaberrimis, costa supra tenuiter impressa subtus elevata, venis lateralibus primariis supra vix subtus distincte elevatis gracillimis; foliolo terminali longissimo angustiore lanceolato 6 cm. longo 13 mm. lato, petiolulis 2 mm. longis supra sulcatis, rhachibus cum petiolis gracilibus arcuatis aculeolatis supra sulcatis. Paniculæ axillares 4-5 cm. longæ laxiuscule floriferæ, rhachibus rectis minute hirsutis 4-quetris ad nodos glomeratim floriferis, vel floribus ad apicem ramorum paniculorum glomeratim pedicellatimque sitis, bracteis sub pedicello singulis, bracteolis duabus; bracteis cuspidato-triangularibus $\frac{1}{2}$ mm. longis hirsutis; bracteolis subulatis minutis $\frac{1}{2}$ mm. longis; pedicellis $\frac{1}{2}$ mm. longis hirsutis articulatim a rhachide solutis. Fl. ♂: pallido-viridis. Sepala 5 triangularia 1- $\frac{2}{3}$ mm. longa et lata acuta utraque glabra margine plus minus breve hirsuta. Petala 5 elongato-oblonga 2 mm. longa 1 mm. lata apice obtusa basi leviter contracta margine subintegra sub microscopio minute denticulata utraque glabra. Stamina 5, filamentis 2 $\frac{1}{2}$ mm. longis glabris, antheris oblongo-sagittiformibus glabris $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis apice obtusis basi sagittatis. Discus haud distinctus. Rudimentum ovarii depresso-globosum $\frac{1}{3}$ mm. longum, stylis 2 oblongis $\frac{1}{2}$ mm. longis. Fl. ♀: viridescens. Sepala ut fl. ♂. Petala ovata 2 $\frac{1}{2}$ mm. longa 1 $\frac{1}{2}$ mm. lata utraque pagine glabra apice obtusa basi leviter contracta margine sub microscopio minute ciliolata. Stamina 5 minuta, antheris obsoletis. Discus pulviniformis in specimine exsiccatō indistinctus. Ovarium depresso-globosum 1 $\frac{1}{3}$ mm. longum totiusque latum glabrum, carpellis 4 (vel 5?) distinctis octantiformibus dorso minute impresso-punctatis, basi rotundatis apice abrupte ad stylum abeuntibus, stylis 1 $\frac{1}{2}$ mm. longis exteriore valde recurvatis apice subgloboso-dilatatis stigmatosis. Panicula fructifera pyramidalis 3-4 cm. longa. Fructus folliculiformis 4 mm. longus 11 mm. in diametro, carpellis depresso-globosis 6 $\frac{1}{2}$ mm. longis 6 mm. latis apice plus minus apiculatis latere leviter compressis. Semina ignota.

HAB. Mt. Arisan; inter Heishana et Nimandaira, leg. B. HAYATA, Aprili. 1914, (fr.); inter Funkiko et Taroyen, leg. TAKEO ITÔ et B. HAYATA, Mart. 1914, (fl. ♀ et ♂).

Fagara cyrtorhachia and *F. leiorhachia* are contrasted by the leaves which are in the former 7-17 foliolate with smaller leaflets, but in the latter 5-foliolate with much larger leaflets.

Fagara laxifoliolata HAYATA sp. nov. Frutex? rami et ramuli haud aculeati longitudinaliter rugulosi minute lenticellati. Folia alterna tenuiter coriacea pari-vel imparipinnata 7-9-foliolata in ambitu oblanceolata cum petiolis 2 cm. longis 20-25 cm. longa 8-9 cm. lata, foliis superioribus majoribus, inferioribus minoribus, foliolo terminali cuspidato-obovato 8 cm. longo $3\frac{1}{2}$ cm. lato apice breve subito cuspidato-caudato ad summum tenuiter retuso basi subito acuminato margine integro tenuiter desuper excurvato utraque glabro supra nitido, costa supra valde impressa subtus prominenti, venis primariis lateralibus utraque pagine tenuiter sed distincte elevatis venulis supra elevatis distincte reticulatis sed subtus vix visis, venis rectis, petiolulo 2 cm. longo; foliolis lateralibus basi obliquis acutis, petiolulis 1 mm. longis sulcatis; foliolis a se 3 cm. remotis, rhachibus petiolisque et petiolulisque supra sulcatis; petiolis communibus 2 cm. longis. Paniculae axillares 5-7 cm. longae in ambitu pyramidales abundanter floriferae, rhachibus pedicellisque hirsutis, pedicellis ultimis 2-3 mm. longis basi articulatim solutis, bracteis minutis triangularibus $\frac{3}{4}$ mm. longis totiusque latis acutis margine minute ciliatis. Flores ♀. Sepala 4, triangularia $\frac{3}{4}$ mm. longa $\frac{3}{4}$ mm. lata apice acuta vel obtusa utraque glabra margine sub lente ciliolata. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa basi plus minus contracta margine sub microscopio minute crenulata utraque glabra. Staminodia nulla vel minuta squamiformia. Ovarium 4-merum, carpellis subdistinctis quadrantiformibus $1\frac{1}{2}$ mm. longis dorso impresso-punctatis, stylis 1 mm. longis stigmatibus globosis oblique sitis. Discus (vel torus?) sub ovario insitus $\frac{1}{2}$ mm. longus pulviniformis.

HAB. Mt. Shichiseitonzan, leg. Y. SHIMADA, Aprili. 1911.

Near *F. Avicennae* DC. (BENTH. Fl. Hongk. p. 58), but differs from it by the 4-carpelled flowers and obtusely cuspidate leaflets.

Fagara leiorhachia HAYATA sp. nov. Frutex scandentissimus. Rami

recti teretes fusco-cinerascentes, cortice longitudinaliter ruguloso lenticellis minutissimis notato. Folia 5-foliolata in ambitu obovata 14 cm. longa 12 cm. lata, foliolis infimis minimis, foliolo terminali maximo obovato vel oblongo 8 cm. longo 3 cm. lato apice longe caudato basi cuneato ad summum obtuso vel minute retuso supra subnitido, costa supra tenuiter impressa subtus elevata, venis primariis lateralibus supra tenuiter minus subtus distincte elevatis gracilibus rectis angulo obtusissimo divaricatis, margine tenuiter desuper recurvo, supra fusco subtus pallido utraque glabro (petiolulo $1\frac{1}{2}$ cm. longo); foliolis lateralibus alternis vel suboppositis; petiolulis 6 mm. longis; rhachibus cum petiolis supra planis vel sub-sulcatis; petiolis communibus $3\frac{1}{2}$ cm. longis; rhachis foliorum haud vel vix aculeolata. Flores ignoti. Panicula fructifera axillaris vel terminalis densissime fructifera. Fructus folliculiformis 6 mm. longus 12 mm. in diametro 3-4- vel 5-carpellaris, carpellis distinctis oblongo-subglobosis apice apiculatis 7 mm. longis $5\frac{1}{2}$ mm. latis latere leviter compressis extus rugulosis, endocarpis cartilagineis; semina ignota.

HAB. Mt. Arisan, inter Heishana et Funkiko, leg. B. HAYATA, Aprili. 1914, (fr.).

Near *F. laxifoliolata*, but differs from it in having 3-5-foliolate leaves.

***Murraya* LINN.**

***Murraya euchrestifolia* HAYATA sp. nov.** Frutex? Rami fusco-cinerascentes longitudinaliter minute rugulosi minute lenticellati, ramulis sursum tenuiter hirsutis. Folia abrupte (semper?) pinnata 4-8-foliolata cum petiolis 20-25 cm. longa in ambitu obovata tenuiter coriacea vel chartacea, foliolis superioribus majoribus inferioribus minoribus; foliolis superioribus elongato-oblongis 7-8 cm. longis $2\frac{1}{2}$ -3 cm. latis apice acuminatis ad summum obtusis basi acutis margine subintegris tenuiter desuper recurvis, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costæ 5-7 rectis a costa angulo 45° - 50° egressis sursum ramosis utraque pagine tenuissime elevatis, pagine supra viridibus subtus pallidis minute pauceque nigro-punctatis utraque glabris, petiolulis 3 mm. longis, foliolis inferioribus minoribus circ. 5 cm. longis; foliolis suboppositis vel alternis a se $3\frac{1}{2}$ cm. distantibus; petiolis communibus $3\frac{1}{2}$ cm. longis interjugam æquantibus cum rhachibus teretibus glabris nigro-punctatis. Flores ignoti. Cymæ terminales 8 cm. longæ 13 cm. latæ abundanter

fructiferæ, ramis divaricatis. Fructus perfecte globosus 1 cm. in diametro glaber haud rugosus sublaevis minute nigro-punctatus, punctis plus minus elevatis, pericarpis tenuiter crassiusculis. Semina obovoideo-subglobosa 8 mm. longa totiusque lata, testa tenuiter membranacea; albumen O; embryo amplius, cotyledonibus crassissimis obovato-rotundatis 8 mm. longis totiusque latis 3 mm. crassis, radicula infra minutissima punctiformi 1 mm. longa inter cotyledones sita.

HAB. Nantō: Baikei, leg. TAYEMON ITÔ, Jan. 1914.

Near *M. Koenigii*, but differs from it in having much looser inflorescence and crimson-red fruits. *M. Koenigii* has much denser flowers and black fruits.

Clausena BURM.

Clausena tetramera HAYATA sp. nov. Frutex? Rami et ramuli teretes fuscentes longitudinaliter minute rugulosi minute lenticellati minute sparse hirsuti. Folia alterna chartacea pinnata in ambitu oblonga cum petiolis 25–30 cm. longa 10–14 cm. lata, foliolis superioribus majoribus; foliolo terminali leviter minore caudato-ovato $6\frac{1}{2}$ cm. longo $2\frac{1}{2}$ cm. lato apice caudato-acuminato ad summum obtuso basi late cuneato margine subintegro vel crenulato, costa supra tenuissime subtus prominente elevata, venis lateralibus primariis utroque latere costæ 9–11 ramosis sursum arcuatis supra haud subtus tenuiter elevatis cum costa rubro-coloratis, supra subglabro subtus ad costas et venas laterales tenuiter hirsuto; foliolis lateralibus oblique lanceolatis 8 cm. longis $2\frac{1}{2}$ cm. latis apice acuminatis basi latere superiore late acutis latere inferiore angustissime cuneatis a se $2\frac{1}{2}$ –3 cm. remotis, petiolulis 5 mm. longis; petiolis communibus 4 cm. longis. Paniculæ terminales 20 cm. longæ 15 cm. latæ floribundæ a basi ramosæ tenuiter hirsutæ, ramis divaricatis, floribus ad apicem ramuli paniculæ cymose sitis; rhachibus pedicellisque hirsutis; pedicellis ultimis 1 mm. longis basi articulatim solutis, bracteis minutis hirsutis oblongis $\frac{1}{2}$ mm. longis. Calyx brevissime obconicus subplanus 4-lobatus, lobis semi-rotundato-triangularibus $\frac{1}{3}$ mm. longis breve cuspidatis extus rugosis intus lævibus margine apice ciliolatis vel haud ciliolatis. Petala 4 oblonga 3 mm. longa 2 mm. lata apice obtusa integra glabra extus plus minus punctato-tuberculata intus lævia. Stamina 8, filamentis basi dilatatis apice filiformibus, partibus dilatatis oblongo-quadrangularibus $\frac{4}{5}$ mm. longis $\frac{2}{3}$ mm. latis incrassatis apice interiore ad calcar productis glabris, partibus filiformibus 1 mm. longis glabris, antheris

dorsifixis oblongis $1\frac{1}{3}$ mm. longis apice obtusis leviter retusis basi sagittatis interiore dehiscentibus. Ovarium oblongum dense tuberculatum barbatum 1 mm. longum stipitatum, stipite $\frac{1}{2}$ mm. longo glabro, stylo glabro columnari crasso 1 mm. longo $\frac{1}{2}$ mm. lato apice perfecte truncato stigmatoso.

HAB. Hainan, leg. Z. KATSUMADA, 1910.

Near *Clausena Wampi*, but differs from it by the less hairy ovary and much dilated filaments.

Citrus LINN.

***Citrus erythrocarpa* HAYATA** sp. nov. *Fortunella erythrocarpa* HAYATA. Frutex. Rami et ramuli graciles cinerascetes longitudinaliter tenuiter rugulosi. Folia alterna trifoliolata vel simplicia chartacea, foliolis ovato-lanceolatis vel lanceolatis 7 cm. longis $2\frac{1}{2}$ cm. latis apice acuminatis sed ad summum obtusis basi acuminatis margine integris utraque pagine glabris, costa supra tenuiter impressa subtus elevata, pellucido-punctatis, venis venulisque supra tenuiter vel obscure subtus distincte elevatis. Flores ignoti. Cymæ terminales 2–3 cm. longæ. Fructus drupiformis ellipsoideus 15 mm. longus 10 mm. latus apice brevissime apiculatus lævis glaber 1-spermus rubescens, pericarpis crassiusculis tenuibus. Semina solitaria ellipsoidea 13 mm. longa 8 mm. lata apice brevissime apiculata basi rotundata, testa rubescenti membranacea latere uno arillis linearibus ramosis adnatis instructa. Albumen O; embryo amplus ellipsoideus, cotyledonibus ellipticis 10 mm. longis 6 mm. latis crassissimis minute punctatis osseis; radicula brevissima truncata ad centrum minute impressa brevissime rubro-hirsuta.

HAB. inter Karapin et Suisharyō, leg. B. HAYATA, Aprili. 1914, (fr.).

Near *Citrus japonica* in the 1-seeded fruits, but differs from it in having shortly apiculate elliptical fruits and 3-foliolate leaves.

Simarubeæ.

Picrasma BLUME.

***Picrasma quassioides* BENN.**; BENTH. Fl. Hongk. p. 61; HOOK. f. Fl. Brit. Ind. I. p. 520; HEMSL. Ind. Fl. Sin. I. p. 112; MATSUM. Ind. Pl. Jap. II.-2 p. 296.

HAB. Ilōgō, Musha, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916, (♂ et ♀).

Compared with a Japanese specimen so named in the Herbarium at Tōkyō. Petals of female flowers of the Formosan are acuter and more hairy than those of the Japanese.

Celastrineæ.

Celastrus LINN.

Celastrus elevativena HAYATA sp. nov. Frutex scandentissimus, ramis et ramulis gracilibus interdum volubilibus fuscentibus cortice longitudinaliter elevato-striatis lenticellatis, lenticellis rotundatis. Folia alterna oblonga lanceolata vel obovato-oblonga $1\frac{1}{2}$ –5 cm. longa 12–23 mm. lata apice acuta basi obtusa vel acuta margine minute serrulata coriacea, costis venis venulisque utroque pagine elevatis, utroque pagine glabra, petiolis 2–8 mm. longis. Capsulæ axillares solitariae vel gaminæ, pedicellis 5–6 cm. longis rectis divaricatis, 3-valvatae, valvis viridibus crasse coriaceis extus transverse rugulosis tenuissime grosse reticulatis rotundatis 6 mm. in diametro apice reliquis styli apiculatis. Semina matura ignota.

HAB. Kwarenkō, leg. U. FAURIE.

Near *C. leiocarpa* HAYATA, but differs from it in having narrower leaves with elevated veinlets on the upper surface.

Rhamneæ.

Rhamnus LINN.

Rhamnus (*Eurhamnus-Cervispina*) ***oiwakensis*** HAYATA sp. nov. Frutex 1–2 m. alt. ramosissimus, ramis teretibus fusco-purpurascens nitidis lævibus haud lenticellatis, ramulis setiformibus alternatim vel decussatim dispositis $\frac{1}{2}$ –2 cm. longis teretibus, ramulis foliiferis brevissimis 3 mm. longis apice subverticillatim approximativ foliatis basi perulis dense obtectis, perulis coriaceis castaneo-coloratis 1 mm. longis ciliatis obtusis vel acutis convexis. Folia approximata obovato-spathulata vel obovata $1-1\frac{1}{2}$ cm. longa 6 mm. lata apice obtusissima vel rotundata basi cuneato-attenuata margine deorsum integra sursum crenata ad sinus crenarum setulis digiti-formibus rubescentibus $\frac{1}{6}$ mm.

longis instructa, supra ad costas tenuiter hirsuta subtus glaberrima, supra venis costis planis haud distinctis, subtus costis venis venulis reticulatis distincte elevatis, petiolis 2 mm. longis minute hirsutis supra sulcatis, stipulis subulato-linearibus $1\frac{1}{2}$ mm. longis hirsutis basi setulis digiti-formibus obtusis 4–5 brevissimis instructis. Flores ♂ axillares solitarii, pedicellis 4 mm. longis minute hirsutis apice ad calycem abeuntibus. Calyx late campanulatus pallido-viridis glaber, tubo tetragono-obpyramidali 8-costato 1 mm. longo $1\frac{1}{2}$ mm. lato intus extusque glabro, limbo 4-partito, partibus oblongo-triangularibus $2\frac{2}{3}$ mm. longis $1\frac{1}{2}$ mm. latis plus minus crassiusculis glabris 1-nerviis apice acuminatis ad summum obtusis marginatis valvatis patentissimis. Petala 4 minute spathulata 1 mm. longa apice obtusa basi cuneato-attenuata glabra tenuissima concava stamina involventia ad marginem tubi calycis affixa glabra erecta. Stamina 4 ad marginem tubi calycis affixa petalis opposita, filamentis erectis validiusculis 1 mm. longis glabris, antheris ovatis $\frac{1}{2}$ – $\frac{1}{3}$ mm. longis apice obtusis basi lobatis dorsifixis. Rudimentum ovarii minutum globosum, stylo columnari $\frac{1}{4}$ mm. longo apice 2-partito. Fl. ♀ ignoti.

HAB. Oiwake, 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Remarkable for the very small congested leaves.

Sabiaceæ.

Meliosma BLUME.

Meliosma callicarpæfolia HAYATA (Pl. II.); Ic. Pl. Formos. III. p.

68. Descriptio aucta: Flores apertientes: bractea singula ovata $\frac{2}{3}$ mm. longa $\frac{1}{2}$ mm. lata apice obtusissima crassiuscula margine ciliolata; bracteola minuta 2. Sepala 3–4 late rotundata vel semi-rotundata $1\frac{1}{4}$ mm. lata $\frac{3}{4}$ mm. longa apice rotundata basi truncato-contracta integra concava glaberrima ad insertionem $\frac{1}{3}$ mm. lata margine haud vel vix ciliolata. Petala 3 late rotundata plus minus inaequalia majora circ. 2 mm. lata $1\frac{1}{2}$ mm. longa apice rotundata basi contracta ad insertionem $\frac{1}{4}$ mm. lata apice crassiuscula margine integra imbricata. Stamina perfecta 2 cum petalis alterna, filamentis glabris linearibus basi dorso appendicibus obsagittiformibus instructis, apice connectivis semi-rotundatis peltatis $\frac{1}{2}$ mm. latis $\frac{1}{3}$ mm. longis terminatis, loculis antherarum 2 supra connectivum sitis introrsis globosis se contactis $\frac{1}{4}$ mm. in diametro flavis. Staminodia

3 cum petalis affixa dorso complanata quadrangularia 1 mm. longa $\frac{2}{3}$ mm. lata apice utroque latere auriculato-dilatata foveolataque. Glandulæ disci 2-3 membranaceæ triangulares $\frac{1}{2}$ mm. latæ apice bicuspidatæ vel simpliciter cuspidatæ glabræ. Ovarium late rotundatum $\frac{2}{3}$ mm. longum $\frac{3}{4}$ mm. latum 2-loculare glabrum, stylo brevi columnari $\frac{1}{2}$ mm. longo apice subulato-acuto.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, (No. 270).

Rosaceæ.

Rubus LINN.

Rubus rarissimus HAYATA sp. nov. Suffrutex, rami annotini fusco-rubescens teretes tenuiter pubescentes minutissime striati remote aculeati, aculeis latere complanatis $2\frac{1}{2}$ mm. longis basi dilatatis apice deorsum plus minus recurvis, ramulis hornotinis fulvescentibus teretibus pubescentibus aculeatis 1-2-foliatis basi perulis multi-seriatis extus villosis instructis. Folia alterna trifoliata, folio terminali maximo subrhomboideo 8 cm. longo 6 cm. lato apice cuspidato basi triangulari-obtuso margine duplicato-dentato, (dentibus triangularibus apice breve aristatis, aristis sursum recurvis), supra subglabro vel tenuissime pubescenti subtus densissime brevissime villosa-tomentoso, tomentis pallido-fulvescentibus, costis et venis supra compressis subtus distincte elevatis, venis lateralibus primariis utroque latere 7-8 rectis mediis a costa angulo 30° egressis ad apicem dentium attingentibus, venulis rectis ad apicem dentium attingentibus vel reticulatis supra impressis subtus elevatis; foliolis lateralibus minoribus 6 cm. longis $3\frac{1}{2}$ cm. latis apice acuminatis basi oblique obtusis latere inferiore latioribus quam latere superiore, brevissime petiolulatis, petiolulis 1-2 mm. longis; petiolis communibus 6 cm. longis pubescentibus aculeatis, rhachibus $2\frac{1}{2}$ cm. longis, stipulis linearibus 8 mm. longis $\frac{2}{3}$ mm. latis acuminatis. Flores cymosi. Cymæ terminales vel axillares pedunculatæ vel sessiles cum pedunculis $2\frac{1}{2}$ cm. longæ villosæ 3-20-floratæ, pedicellis ultimis 1 cm. longis. Calyx utraque villosus, cupula 3 mm. in diametro extus villosa intus glabra extus impressa intus elevata, lobis patentibus lineari-triangularibus 4-5 mm. longis 2 mm. latis villosis ad summum glabris. Petala 5 obovato-spathulata cum unguibus 4 mm. longa 3 mm. lata apice rotundato-truncata basi subito unguiculata, unguibus 1 mm. longis $\frac{2}{4}$ mm. latis, margine subintegra vel crosa intus glabra sed basi hirsuta

extus versus costam hirsuta. Stamina ∞ ad marginem cupulae inserta, filamentis filiformibus glabris 2 mm. longis, antheris ovato-oblongis $\frac{1}{2}$ mm. longis glabris. Receptaculum carpellorum elevatum globosum breve stipitatum villosum, carpellis ∞ semi-obovoideis basi brevissime stipitatis, (stipitibus pilosis) basi apiceque pilosis medio latereque glabris, stylis terminalibus 2 mm. longis rubescentibus basi pilosis sursum glabris apice oblique truncatis 2-lobatis stigmatiferis.

HAB. Arisan, ad 2500 ped. alt., leg. U. FAURIE, Junio 1914, (No. 33).

Near *Rubus idaeus* LINN. subsp. *nipponica* FOCKE, but differs from it in having more numerous and less pilose carpels.

***Cotoneaster* MEDIK.**

Cotoneaster morrisonensis HAYATA Ic. Pl. Formos. V. p. 62. Flores axillares vel ad apicem ramulorum terminales solitarii, pedicellis 3-4 mm. longis strigoso-hirsutis, pilis adpressis fulvescentibus rectis. Calyx obconicus 2-3 mm. longus totiusque latus extus adpresse hirsutus apice 5-lobatus, lobis triangularibus crassiusculis extus hirsutis intus glabris apice obtuso-truncatis 1 mm. longis $1\frac{1}{2}$ mm. latis. Petala 5 ad basin lobi calycis affixa rotundata 3 mm. longa totiusque lata apice plus minus emarginata vel rotundata basi breve unguiculata contracta ad insertionem $\frac{2}{3}$ mm. lata margine subintegra vel tenuiter erosa intus valde concava. Stamina ∞ ad basin lobi calycis affixa, filamentis $1\frac{1}{2}$ mm. longis basi incrassatis apice subulatis glabris, antheris rotundato-ovatis $\frac{1}{2}$ mm. longis totiusque latis apice minus basi plus emarginatis; carpellis 2 a se distinctis dorso usque ad medium cum calycis tubo connatis sursum liberis, dorso dense albo-hirsutis, stylis columnaribus $1\frac{1}{2}$ mm. longis glabris.

HAB. Taihasenzan, leg. TAYEMON ITÔ, ad 10000 ped. alt., Aprili. 1915.

***Photinia* LINDL.**

Photinia lasiopetala HAYATA sp. nov. (Fig. 1.) Frutex, ramis et ramulis fusco-cinerascentibus longitudinaliter strigosis, lenticellis obscuris, haud hirsutis, ramulis annotinis glabris rubescentibus laevibus foliatis. Folia in vivo supra atroviridia et nitida in exsiccato pallido-rubra obovato-elliptica vel lanceolata obovata 10-15 cm. longa $2\frac{1}{2}$ - $4\frac{1}{2}$ cm. lata apice breve acuminata versus basin gradatim attenuata ad basin subito acuta margine minute serrulata margine versus basin integra coriacea utraque glabra, costa supra impressa subtus elevata, venis venulis supra minus subtus plus elevatis gracillimis, venis

lateralibus primariis utroque latere circ. 15 tenuissimis a costa angulo 30° egressis prope marginem evanescentibus, petiolis 1–2 cm. longis glabris basi subito dilatatis caulem partim amplexantibus supra sulcatis; stipulis nullis. Panicula terminalis 8 cm.

longa pyramidalis, ramis divaricatis glabris vel tenuiter hirsutis, pedicellis $1\frac{1}{3}$ cm. longis hirsutis. Calyx pallido-viridis obconicus 2 mm. longus totiusque latus hirsutus 5-dentato-lobatus, lobis vel dentibus erectis triangularibus 1 mm. latis $\frac{2}{3}$ mm. longis apice acutis basi haud contractis crassiusculis, tubo intus glabro. Petala alba in ambitu obovata basi unguiculata, lamina subrotundata $2\frac{1}{2}$ mm. longa totiusque lata apice obtuse bilobata extus glabra intus basi longe albo-hirsuta, pilis crispatis, unguibus 1 mm. longis intus densissime hirsutis extus glabris exteriori recurvis. Stamina circ. 20 ad apicem tubi 1-seriatim

disposita, filamentis glabris filiformibus $2\frac{1}{2}$ –3 mm. longis, antheris reniformibus basi 2-lobatis apice emarginatis $\frac{2}{3}$ mm. longis totiusque latis flavis. Ovarium ovoideum usque ad medium cum tubo calycis connatum, partibus apicalibus liberis dense albo-hirsutis obconicis 1 mm. longis apice ad stylum abeuntibus; styli 2 basi connati dense hirsuti apice peltatim truncati stigmatosi; ovarium 2-loculare, loculis 2-ovulatis.

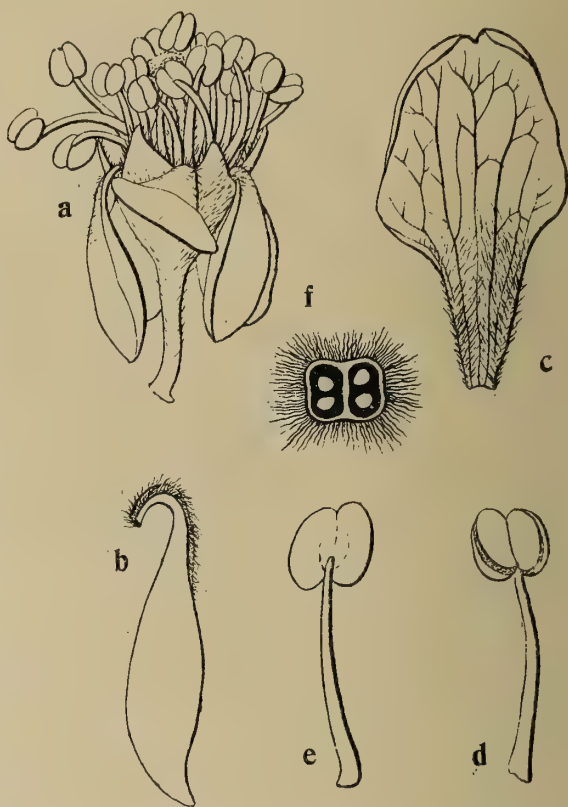


Fig. 1, *Photinia lasiopetala* HAYATA; a, a flower; b, a petal, seen from side; c, the same, seen from above; d, e, stamens, seen from different sides; f, cross section of ovary.

HAB. Musha : Baikei, ad 2500 ped. alt., Aprili. 1916, leg. B. HAYATA.

Near *P. serrulata* LINDL., but easily distinguishable from it in having hirsute unguiculate petals. The habit of this new shrub is nearly the same as that of *Deutzia scabra*.

Saxifrageæ.

Itea LINN.

***Itea arisanensis* HAYATA** sp. nov. Frutex, ramulis gracilibus, cortice longitudinaliter ruguloso glabro. Folia remote disposita oblonga vel oblongo-lanceolata 10–14 cm. longa 3–5 cm. lata apice acuminata deorsum recurva basi obtusa vel acuta margine tenuiter et remotissime serrulata, (serrulis minutis a se 4–5 mm. remotis ascendentibus apice interiore recurvis), chartacea utraque pagine glaberrima, costis et venis supra tenuiter impressis subtus elevatis, venis primariis lateralibus gracillimis utroque latere costæ 5–8 arcuatis sursum margine subparallelis gradatim evanescentibus, venulis gracillimis costa transverse dispositis transverse reticulatis supra laud visis subtus distincte visis, petiolis 1–1½ cm. longis supra sulcatis glabris. Flores ignoti. Racemi fructiferi terminales vel axillares 8–10 cm. longi 1½–2 cm. lati, pedunculis 1–2 cm. longis cum rhachibus pubescentibus, fructibus geminatim vel solitariter secus rhachin racemi dispositis transverse patentibus vel descendentibus, pedicellis 5 mm. longis apice leviter dilatatis ad tubum calycis abeuntibus, bracteis sub pedicello linearibus vel lanceolatis 1½ mm. longis. Calycis fructiferi tubus infundibulicampanulatus 1 mm. longus 1½ mm. latus, limbo 2½ mm. in diametro margine lobato, lobis 5 triangulari-cuspidatis 1 mm. longis totiusque latis apice acutis, sinibus inter lobos late rotundatis. Carpella 2 supra tubum calycis fere distincta erecta leviter divaricata fusiformi-linearia supra cupulam ad 5 mm. exserta 1 mm. lata sparse minute hirsuta apice attenuata dorso in sectione convexa facie plana in sectione semi-rotundata sutura ventrali dehiscentia. Semina minuta numerosa ovoideo-fusiformia 1¼ mm. longa ¼ mm. lata altri extremitate attenuata acuta altri extremitate obtusa, testa sicca rugosissima fusco-rubescente nitida.

HAB. Mt. Arisan : inter Suisharyō et Funkiko, leg. B. HAYATA, Aprili. 1914. (Fructus).

Near *Itea chinensis*, but distinguishable from it in having less serrate leaves of much thinner texture.

Crassulaceæ.

Sedum LINN.

Sedum uraiense HAYATA sp. nov. Herba tenuissima basi repens, partibus erectis 10 cm. longis crispato-hirsutis, pilis transverse patentibus. Folia in exsiccato tenuissime membranacea in vivo crassiuscula opposita vel rarius ternata a se 2–3 cm. remota petiolata, lamina ovata vel rotundato-ovata circ. $1\frac{1}{2}$ –2 cm. longa 13–15 mm. lata apice obtusissima basi subito attenuata ad petiolum abeuntia margine integra densiuscule patento-ciliolata supra sparsissime hirsuta subtus subglabra, petiolis 5–8 mm. longis. Cymæ terminales laxissime floratæ cum pedunculis 7 cm. longis brevissime patentohirsutæ, pedicellis terminalibus 2–5 mm. longis. Sepala 5 extus oblongo-triangularia $1\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata apice obtusa basi haud contracta margine integra extus dense hirsuta intus glabra tenuiter 1-nervia. Petala 5 lanceolata 3– $3\frac{1}{2}$ mm. longa $\frac{3}{4}$ mm.–1 mm. lata apice acuminatissima basi leviter angustata ad insertionem $\frac{1}{2}$ mm. lata integra tenuiter 1-nervia. Stamina 10, filamentis filiformibus 2 mm. longis glabris, antheris globosis $\frac{1}{4}$ mm. in diametro 2-locularibus; glandulis 5 carpello oppositis rectangularibus $\frac{1}{5}$ mm. longis. Carpella 5 lanceolata glanduloso-hirsuta apice ad stylum attenuata; carpella matura membranacea hyalina oblonga 2 mm. longa $\frac{2}{3}$ mm. lata apice ad stylum abeuntia. Semina ovoideo-ellipsoidea utraque truncata circ. $\frac{1}{2}$ mm. longa profunde 8–13-sulcata minute eleganter transverse multo-striata in sectione teres, testa crustacea fusco-castanea. Embryo ignotus.

Sedum drymarioides HAYATA Ic. Pl. Formos. IV. p. 110, (non HANCE).

HAB. Urai, in petrosis rara, leg. U. FAURIE, Aprili. 1914, (No. 810).

Near *S. drymarioides* HANCE, but differs from it in having much longer petals.

Hamamelideæ.

Corylopsis SIEB. et ZUCC.

Corylopsis stenopetala HAYATA (Pl. III.) Ic. Pl. Formos. IV. p. 6. Descriptio aucta: Spicæ fructiferæ erectæ 3–4 cm. longæ cum fructibus

2-3 cm. latæ, pedunculis 4-5 cm. longis glabris; rhachis spicæ post anthesin accrescens hirsuta dense fructifera; calycis tubus in fructu accrescens plus minus stipitatus cum stipite incrassato 1 cm. longus 8 mm. latus, lobis minutis dentiformibus; carpella 2 calycis tubo insita medio supra exserta oblonga apice bicornuta, cornibus exteriore recurvis, 2-valvatim dehiscentia, exocarpio crustaceo fuscenti, endocarpio crustaceo-osseo albo-fulvescenti, 1-sperma; semina ellipsoidea 7-8 mm. longa, testa crustacea nigra nitida.

HAB. Nantō: Jinrinsha, leg. U. MORI, Juli. 1907, (No. 292).

Haloragææ.

Callitriche LINN.

Callitriche japonica ENGELM.; FRANCH. et SAVAT. Enum. Pl. Jap. II. p. 369; ITO et MATSUM. Tent. Fl. Lutch. p. 205; MATSUM. Ind. Pl. Jap. II.-2 p. 310.

HAB. Taihoku: Koteishō, leg. Y. SHIMADA, Mart. 1915. (Fl. et fr.).

DISTRIB. Japan.

Compared with a Japanese specimen in the Herbarium at Tōkyō.

Begoniaceæ.

Begonia LINN.

Begonia aptera HAYATA Mater. Fl. Formos. p. 122. Descriptio aucta: Cymæ terminales cum pedunculis circ. 10 cm. longæ 15 cm. latæ, (pedunculis 5 cm. longis), toto glabræ; pedicellis ultimis 5-13 mm. longis gracillimis. Flores ♂: glabri albicantes; segmenta 4, exteriora 2 interiora 2; exteriora late cordato-rotundata $1\frac{1}{2}$ cm. longa totiusque lata apice obtuse rotundata basi subcordata margine integra; segmenta interiora obovato-spathulata 9 mm. longa 4 mm. lata apice obtusissima basi cuneata subunguiculata margine integra. Semina numerosa, antheris obovatis $1\frac{1}{4}$ mm. longis 1 mm. latis apice emarginatis basi obtuso-cuneatis. Fl. ♀: segmenta ignota; ovarium late depresso-globosum 7 mm. longum 10 mm. latum ex-alatum glabrum; styli 3, 4 mm. longi erecti apice 2-fidi, ramis erectis 3 mm. longis tortuosis.

HAB. Suisha, leg. B. HAYATA et S. SASAKI, Mai. 1912; Maisha, leg. B. HAYATA et S. SASAKI, Jun. 1912.

Begonia ferruginea HAYATA Mater. Fl. Formos. p. 123. Descriptio aucta: Segmenta 5; exteriora 2 majora, interiora 2 minora; exteriora late oblonga 10 mm. longa 7 mm. lata plus minus obliqua apice rotundata margine subintegra extus hirsuta intus glabra; segmenta interiora minora; intimum minimum glabrum oblongum 7 mm. longum $3\frac{1}{2}$ mm. latum apice obtusum. Styli 2-3 mm. alti semi-infundibuli-forme dilatati 2-fidi; ramis 2 mm. longis erectis tortuosis vermiformibus. Ovarium hirsutum oblongo-obovatum 6-7 mm. longum 4 mm. latum obliquum 3-alatum; ala posteriore elongata transverse sita lineari circ. 10 mm. longa 4 mm. lata apice obtusissima hirsuta; alis lateralibus verticaliter sitis linearibus 8 mm. longis sursum latioribus 1-2 mm. latis deorsum angustioribus ad nullum reductis hirsutis. Capsula ab apice pedicellorum subito deorsum reflexorum pendula 2-locularis tenuiter ferrugineo-tomentosa demum subglabrata (alis exceptis) lineari-obovata 15 mm. longa 5 mm. lata apice subtruncata basi attenuata ad pedicellum abeuns; ala posteriore quadrangulariformi $2\frac{1}{2}$ cm. longa $1\frac{1}{2}$ cm. lata apice obtusissima tenuiter tomentosa nervosa transverse descendenteque sita; alis lateralibus linearibus verticaliter sitis $1\frac{1}{2}$ cm. longis 4 mm. latis nervosis tenuiter tomentosis. Semina numerosissima minutissima polygono-ellipsoidea reticulata rubro-fulvescentia $\frac{1}{4}$ mm. longa.

HAB. Arisan, leg. B. HAYATA, Jan. 1912, (typus fructus).

The present species is contrasted from *B. laciniata* ROXB. var. *formosana* HAYATA in having hairy ovary and hairy outer segments which are obliquely oblong and quite rounded at the apex, and in having quite erect branches of the styles.

Begonia laciniata ROXB. var. **formosana** HAYATA Mater. Fl. Formos. p. 124. Descriptio aucta: Fl. ♀: segmenta 5, exteriora 2; interiora 3; segmentum exterius rotundatum 8 mm. longum 7 mm. latum apice triangulari-obtusum basi rotundatum ad insertionem 3 mm. latum margine subintegrum; interiora minora inæqualia. Styli 2, breviores 1 mm. alti 2-fidi, ramis vermiforme recurvis. Ovarium oblique triquetrum 5 mm. longum ad angulum alatum, alis inæqualibus; ala posteriore quadrangulariformi 4 mm. longa 3 mm. lata ovario transversum sita, alis lateralibus angustissime linearibus 3 mm. longis 1 mm. latis. Flores cum ovario alisque toto glabri.

HAB. Mai, Juli. 1912, leg. B. HAYATA.

Araliaceæ.

Heptapleurum GAERTN.

Heptapleurum arboricolum HAYATA sp. nov. (Pl. IV.) *Schefflera arboricola* HAYATA. Frutex circ. 3-4 m. altus ramosus, ramulis crassiusculis sursum 7-8 mm. in diametro densiuscule lenticellatis, lenticellis oblongis 2-3 mm. longis sursum foliatis. Folia alterna longe petiolata palmatim 7-8-foliolata, foliolis centralibus majoribus, basilaribus minoribus, totis petiolulatis; foliolum centrale obovato-oblongum 9 cm. longum 4 cm. latum apice obtusissimum ad centrum summi emarginatum deorsum angustius ad extremitatem obtusum margine integerrimum, costa supra minus subtus plus elevata, venis venulis supra plus subtus minus elevatis, utraque pagine glaberrimum, supra nitidum subtus glaucum pallidum, venis lateralibus primariis utroque costæ latere 5-6, mediis a costa angulo 45° egressis subrectis sursum arcuatis apice ramosis, venulis elevato-reticulatis, petiolulis 3½-2½ cm. longis semi-teretibus sursum sulcatis subalatis basi cum apice petioli articulatis glabris; petiolis communibus 12-15 cm. longis teretibus glabris subrectis apice subito sursum recurvis basi valde dilatatis, partibus dilatatis auriculi-formibus, auriculis 5 mm. longis et latis semi-rotundatis coriaceis. Racemi terminales vel ad axillas foliorum apicalium siti simplices vel paniculato-umbellatim dispositi; racemis vel ramis panicularum subæquilongis 20 cm. longis in ambitu cylindricis remote ramulosis, ramulis æquilongis 1 cm. longis divaricatis apice flores umbellatim circ. 10 gerentibus subglabris vel hirsutis, bracteis caducis ignotis, pedicellis florum 5-7 mm. longis radiatim divaricatis rectis glabris vel sparse hirsutis apice plus minus dilatatis ad calycem abeuntibus. Calyx depresso-campanulatus 1½ mm. longus 2 mm. in diametro margine integer vel obscure dentatus, dentibus minutis haud distinctis. Petala 5-7 lineari-triangularia 2½ mm. longa 1-1½ mm. lata apice acuta ad summum interdum intus cornibus instructa basi plus minus contacta 3-nervia glabra. Stamina 5-7, ad marginem disci inserta, filamentis glabris filiformibus complanatis 2½ mm. longis, antheris late rotundatis 1 mm. longis totiusque latis apice basique 2-lobatis. Discus pulvini-formis. Stylus subnullus, stigmate depresso-rotundato 1½ mm. in diametro ¼ mm. alto. Ovarium 5-7-loculare, loculis 1-ovulatis. Fructus obovoideo-globosus 5 mm. longus 4 mm. latus distincte 5-6-sulcatus.

HAB. Tōyenchō : Kappansan, ad truncos Fici insularis crescens, leg. S. SASAKI, Nov. 1915.

Near *Heptapleurum octophyllum* HANCE; but distinguishable from it by the much smaller, thicker, coriaceous leaves and in the very depressed rounded stigmata. *H. octophyllum* is terrestrial, but this new species is always found to be epiphytic.

Caprifoliaceæ.

Lonicera LINN.

Lonicera oiwakensis HAYATA sp. nov. (Pl. V.) Frutex 1–2 m. altus, ramis rectis striatis teretibus, cortice cinerascenti minute muricato haud hirsuto longitudinaliter fissio et soluto, ramulis divaricatis strigoso-pilosis rectis foliiferis teretibus. Folia opposita elliptica rigide coriacea $2\frac{1}{2}$ cm. longa $1\frac{1}{2}$ cm. lata apice emarginata vel rotundata basi rotundata vel truncata margine integra setulosa, costa supra impressa subtus elevata, venis supra impressis subtus elevatis, venulis reticulatis supra tenuiter impressis subtus elevatis, pagina supra scaberrima ad centrum reticulorum setula instructa, subtus ad venas venulas strigoso-hirsuta, in exsicco supra fuscentia subtus fulvo-flavescentia, venis lateralibus primariis utroque costæ 4 arcuatis, petiolis 2–3 mm. longis hirsutis supra sulcatis basi triangulari-dilatatis ad pulvinum abeuntibus, pulvinis foliorum cum iis oppositis fere amplexicaulibus. Flores subpenduli subalbi apice plus minus rosei a basi ramuli hornotini brevis 1–2 cm. longi oriundi, pedunculis gracilibus nutantibus 1 cm. longis vel interdum ad nullum reductis valde complanatis strigoso-scabris apice 2-bracteatis flores geminatim gerentibus, bracteis oppositis linearibus falcatis recurvis 8 mm. longis 1 mm. latis acuminatis margine integris setulosis supra tenuiter hirsutis subtus costatis, ad costas setuloso-hirsutis. Calyx viridis cum eo opposito latere interiore toto connatus, tubo obconico-cylindrico glabro 2 mm. longo 1 mm. lato apice truncato basi cuneato, limbo cupuli-formi campanulato extus intusque glabro 1 mm. alto 2 mm. in diametro margine tenuiter et irregulariter 5-lobato, lobis apice rotundatis margine ciliolatis. Corolla alba apice rosea tubuloso-infundibuliformis, tubo 7 mm. longo 2 mm. lato basi obliquo valde oblique contracto latere anteriore prope basin gibboso extus setuloso-hirsuto intus strigoso-hirsuto, limbo

2-labiato, labio superiore latiore 7 mm. longo totiusque lato utraque glabro retrorse reflexo apice 4-lobato, lobis oblongis apice rotundatis apice concavis integris; labio inferiore lineari-oblongo 8 mm. longo 4 mm. lato apice obtusissimo margine integro. Stamina 5 infra apicem tubi affixa exserta, filamentis circ. 6 mm. longis subglabris teretibus, antheris oblongo-linearibus $2\frac{1}{2}$ mm. longis albis. Stylus albus columnari-filiformis 1 cm. longus glaber apice plus minus latior, stigmate viridi subterminali peltato oblongo 1 mm. longo sub-oblique peltatim ad apicem styli sito; ovarium inferum 3-loculare, loculis 4-5-ovulatis.

HAB. Musha: Oiwake, ad 8750 ped. alt., leg. B. HAYATA, Aprili. 1916.

Near *L. Morrowii*; but differs from it in the pubescence of the leaves. Hairs on the leaves of this new species are much stouter having a conical dilated base, while those of *L. Morrowii* are much more slender without any conical base.

***Lonicera transarisanensis* HAYATA** (Fig. 2) n. n. *Lonicera angustifolia* HAYATA (non RAFFIN) Ic. Pl. Formos. II. p. 75. Descriptio aucta: Corolla

glabra tubuloso-campanulata, tubo 12 mm. longo basi 1 mm. lato apice 3 mm. lato extus glabro intus densissime hirsuto, limbo expanso-campanulato 2-labiato, labio inferiore lineari 11 mm. longo 3 mm. lato apice obtusissimo basi haud contracto 7-8-nervio (nervis subparallelis) subtus glabro supra versus basin piloso, labio superiore deorsum recurvato margine latere integro rotundato 9 mm. longo totiusque lato apice in ambitu truncato vel emarginato erecto-patenti margine latere exteriori plicato-recurvo apice 4-lobato, lobis 2-lateralibus majoribus late triangularibus 3 mm. longis 4 mm. latis apice obtusissimis concavis margine exteriori integris interiore denticulatis basi latere interiore auriculis singulis triangularibus deorsum recurvis instructis, lobis 2-mediis minoribus rotundato-triangularibus $2\frac{1}{2}$ mm. latis apice obtusissi-

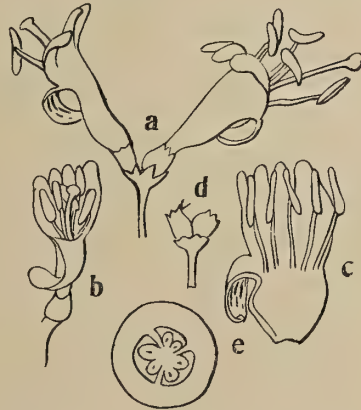


Fig. 2, *Lonicera transarisanensis* HAYATA; a, a pair of flowers; b, a flower; c, corolla expanded; d, ovaries; e, cross section of an ovary; a, b, c, d, nearly natural size.

mis basi haud contractis margine integris; labio superiore extus glabro intus basi plus minus hirsuto. Stamina 5 ab apice tubi corollæ oriunda, filamentis triquetris circ. 8 mm. longis deorsum hirsutis sursum glabris 1-nerviis, antheris linearibus 5 mm. longis 1 mm. latis apice obtusis basi bilobatis, lobis 1 mm. longis, versatilibus. Stylus filiformis 2 cm. longus exsertus dense pilosus (basi apice excepto) sursum glaber, stigmatе globoso 2 mm. lato leviter 3-lobato.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914, (No. 359).

Near *L. Henryi* HEMSL., but differs from it in having quite glabrous peduncles, and in the costas of the leaves which are, in this new species, brownish hairy.

Compositæ.

Chrysanthemum LESS.

Chrysanthemum arisanense HAYATA sp. nov. (Pl. VI.) Herba basi suffrutescens 40 cm. longa molle lanuginoso-hirsuta. Caulis simplex haud ramosus teres 2 mm. in diametro sectionis erectus. Folia radicalia ignota; caulina petiolata pinnatisecta in ambitu ovata 5 cm. longa 3 cm. lata apice acuminata basi truncata vel truncato-cordata, segmentis circ. 5; segmento terminali ovato-lanceolato 3 cm. longo 13 mm. lato apice acuminato basi ad rhachin attenuato laciniato-pinnatilobato, lobis linearibus vel serri-formibus ascendentibus apice cuspidatis acutis superiore leviter recurvis, segmentis lateralibus ovato-lanceolatis vel oblanceolatis oppositis laciniato-pinnatilobatis, apice acutis basi attenuatis; rhachis 2-1 mm. lata; pagina supra brevissime parce sed ad nervos venasque dense crispato-hirsuta subtus dense adpresso-hirsuta, pilis subalbicantibus; petiolis 2 cm. longis dense hirsutis dorso complanatis; folia superiora minora. Capitula 3-4 ad apicem caulis sub-umbellatim disposita, (pedunculis $2\frac{1}{2}$ cm. longis adpresse hirsutis) rotundato-campanulata 8 mm. longa 10 mm. lata. Involucrum rotundato-obconicum 7 mm. longum, bracteis 3-seriatim dispositis, extimis brevissimis oblongo-ovatis 4 mm. longis 2 mm. latis dorso carinatis (ad carinam hirsutis) scariosis apice acutis basi haud contractis intus glabris, mediis longissimis oblongis $6\frac{1}{2}$ mm. longis 3 mm. latis apice obtusis basi ad insertionem 1 mm. latis dorso 1-carinatis intus concavis scariosis utraque glabris, intimis oblanceolatis 6 mm. longis 2 mm. latis apice obtusis basi attenuatis

ad insertionem $\frac{3}{8}$ mm. latis dorso tenuiter carinatis scariosis utraque glabris. Flores marginales 1-seriatim? dispositi liguliformes foeminei. Corolla linguiformis, tubo subnullo vel $\frac{1}{2}$ mm. longo, lamina lineari-oblonga 6 mm. longa $1\frac{1}{2}$ mm. lata apice obtusa basi breve attenuata. Styli $2\frac{1}{2}$ mm. longi apice 2-fidi, ramis dorso complanatis linearibus circ. 1 mm. longis $\frac{3}{5}$ mm. latis utroque latere stigmatiferis apice truncatis breve pectinatis. Flores disci tubiformes hermaphroditi glandulis globosis minutis parce conspersi, tubo $1\frac{1}{2}$ mm. longo $\frac{1}{3}$ - $\frac{1}{2}$ mm. lato cylindrico, limbo campanulato-tubuloso $1\frac{1}{3}$ - $1\frac{1}{2}$ mm. longo 1 mm. lato apice 5-lobato, lobis triangularibus $\frac{1}{2}$ mm. longis totiusque latis apice acutis. Stamina 5 basi limbi oriunda, filamentis filiformibus glabris, antheris linearibus cum appendicibus connectivorum $1\frac{1}{3}$ mm. longis $\frac{3}{5}$ - $\frac{4}{5}$ mm. latis apice appendiculatis, appendiculis linearibus apice acuto-obtusis $\frac{1}{3}$ mm. longis $\frac{2}{5}$ - $\frac{3}{5}$ mm. latis, basi brevissime auriculatis. Styli ut floris foeminei. Achæ-nium ellipsoideum utrinque obtusissimum plus minus obliquum $1\frac{3}{4}$ mm. longum 1 mm. latum fusco-purpurascens.

HAB. Arisan, in rupibus rara, leg. U. FAURIE, Dec. 1914, No. 1427.

Near *Chrysanthemum indicum*, but differs from it in having more deeply laciniate leaves.

Gerbera GRON.

Gerbera integripetala HAYATA sp. nov. Folia radicalia circum basin scapi 5-6 disposita in ambitu oblonga 3 cm. longa 18 mm. lata margine inferiore utroque latere profunde sinuata (sinibus circ. 1 cm. longis 3 mm. latis, margine leviter dentatis, dentibus brevissimis interdum ad aristam reductis apice breve aristatis, aristis a se 4 mm. remotis), membranacea supra glabra subtus molle albo-tomentosa apice acuta basi obtusa, petiolis 4 cm. longis albo-lanuginoso-tomentosis basi gradatim dilatatis. Scapus simplex 15 cm. longus erectus rectus albo-lanuginosus versus apicem 2-3-bracteatus, bracteis linearibus adpressis 6 mm. longis acuminatis dorso costato-carinatis. Capitula simplicia erecta obconica 12 mm. longa; bracteis involucri 2-seriatim dispositis, exterioribus minoribus erecto-linearibus 4 mm. longis dorso costatis obtusis lanuginosis interioribus longioribus linearibus rectis 7 mm. longis apice truncatis 1 mm. latis. Flores ♀ ligulares marginales 1-seriatim dispositi extus purpurei intus albi, tubo corollæ 3 mm. longo, limbo liguliformi lineari 8 mm. longo apice

truncato vel rarius obscure dentato glabro; styli simplices; setæ pappi scabridæ; achaenia linearia hirsuta. Fl. ♂: tubo corollæ 4 mm. longo glabro; limbo 5-partito, partibus 2 distinctis, 3 connatis linearibus obtusis glabris deorsum recurvis; antheræ lineares cum appendicibus et caudis $2\frac{1}{2}$ mm. longæ apice appendiculatæ, appendicibus apicalibus lineari-oblongis $\frac{1}{2}$ mm. longis obtusis, basi sagittatæ caudis simplicibus $\frac{1}{3}$ mm. longis instructæ; filamentis complanatis glabris. Stylus columnaris 6 mm. longus glaber apice 2-lobatus, lobis complanatis subrotundatis stigmatosis, basi haud dilatatus; stylophorum nullum. Discus annuliformis $\frac{1}{3}$ mm. altus. Achænium hirsutum maturum ignotum.

HAB. Gökwanzan, leg. B. HAYATA, Aprili. 21, 1916.

Approaches to *G. Anandria*, but differs from it in having nearly entire corolla-lips of the marginal flowers, and in the pappus-hairs.

***Lactuca* LINN.**

***Lactuca vericolor* SCH-BIP. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 212.**

The Japanese plant has pale white or very slightly purpurascens flowers, while the Formosan has bright yellow ones. The two (Japanese and Formosan) are, therefore, not exactly identical. The Formosan should be regarded as a variety of the Japanese species.

Ericaceæ.

***Rhododendron* LINN.**

***Rhododendron Morii* HAYATA Mater. Fl. Formos. p. 173, et Ic. Pl. Formos. III. p. 139. Descriptio aucta:** Flores ad apicem ramorum 5-10 quasi-umbellatim (cymose) congesti, umbellis basi perulis multis deciduis suffultis; perulis exterioribus obovatis circ. 2 cm. longis 1 cm. latis valde concavis coriaceis apice breve apiculatis brevissime hirsutis, interioribus gradatim elongatis circ. 3 cm. longis; bracteis basi pedicellorum sitis angustato-linearibus 3 cm. longis 7 mm. latis apice breve cuspidatis (cuspidibus 4 mm. longis) extus plus intus minus sericeo-hirsutis; bracteolis lineari-filiformibus 8 mm. longis hirsutis; pedicellis circ. 2 cm. longis brevissime hirsutis. Calycis lobi triangulares vel semi-rotundati 1 mm. longi $1\frac{1}{2}$ mm. lati margine ciliolati vel haud ciliolati extus parce hirsuti intus glabri, ciliolis clavatis brevissimis. Corolla campanulata

plus minus obliqua rosea vel albescens intus latere superiore rubro-punctata, tubo obconico 2 cm. longo, lobis 5 reniformibus 1–1½ cm. longis latoribus quam longis apice rotundatis basi plus minus cordatis. Stamina 9–12, filamentis inæqualibus basi dilatatis hirsutis, antheris lineari-ellipticis 3½–4 mm. longis 2-locularibus apice 2-porosis. Ovarium conicum ellipticum 5–6 mm. longum basi 3 mm. latum hirsutum. Styli 3 cm. longi haud exserti ~-formiter recurvi basi excepto glabri, stigmate brevissime 5–6-lobato; discus lobulatus obscurus.

HAB. Mt. Arisan, leg. B. HAYATA, Mart. 1914.

Styraceæ.

Symplocos LINN.

Symplocos theifolia HAYATA n. n. *Symplocos adinandrifolia* HAYATA var. *theifolia* HAYATA Ic. Pl. Formos. V. p. 96.

HAB. Kuraru, leg. H. INABA, Aug. 1911.

Apocynaceæ.

Anodendron A. DC.

Anodendron suishaense HAYATA sp. nov. (Pl. VII.) Frutex scandento-volubilis. Rami et ramuli teretes fusco-purpurascentes sublaeves, ramulis gracilibus. Folia opposita coriacea lanceolata vel oblanceolata 8–11 cm. longa 1½–2½ cm. lata apice acuta vel breve acuminata basi cuneata vel cuneato-acuta margine integra glabra supra nitida atro-viridia subtus pallida, costa supra subplana subtus elevata, venis lateralibus primariis utroque latere 7–8 basi rectis a costa angulo 60° egressis sursum subito arcuatis cum iis superioribus conjunctis, petiolis 1–1½ cm. longis supra sulcatis glabris. Cymæ paniculatæ terminales cum pedunculis 7 cm. longæ glabræ, pedunculis 2 cm. longis, ternatim ramosæ, ramis rectis divaricatis ad ramificationem 1-bracteatis, bracteis oppositis triangularibus 2 mm. longis 1½ mm. latis cuspidato-acutis glabris dorso carinatis, pedicellis 2 mm. longis rectis glabris apice 2-bracteolatis, bracteolis oppositis ovatis 1½ mm. longis ⅔ mm. latis apice acutis. Calyx glaber 5-partitus, sepalis ovato-triangularibus 2 mm. longis 1 mm. latis apice acutis basi haud vel vix contractis dorso plus minus crassiusculis margine plus minus

ciliolatis; squamæ inter sepala minutæ lepidiformes $\frac{1}{2}$ mm. longæ crassiusculæ glabræ. Corolla flava hypocrateriformis, tubo 4 mm. longo extus glabro deorsum plus minus latiore $1\frac{1}{4}$ mm. lato sursum angustiore $\frac{2}{3}$ mm. lato intus dense hirsuto, lobis dextrorsum obtegentibus patentissimis tortuosis oblique cultriformi-linearibus 5–6 mm. longis $1\frac{1}{3}$ mm. latis falcatin recurvis extus glabris, intus latere uno glabro latere uno hirsuto. Stamina 5, filamentis brevissimis totis basi tubo corollæ connatis apice subliberis intus plus minus hirsutis, antheris lineari-sagittiformibus $1\frac{1}{2}$ mm. longis $\frac{1}{3}$ mm. latis apice acuminatissimis basi sagittatis apice ad appendiculam membranaceam productis. Discus 5-dentatus circum ovarium situs, dentibus triangularibus obtusis $\frac{1}{3}$ mm. longis. Ovarium 2-partitum, stigmate breve stipitato conico $\frac{1}{2}$ mm. longo, stipite $\frac{1}{4}$ mm. longo toto glabro; partitis ovarii depresso-globosis $\frac{1}{2}$ mm. longis apice obtuso. truncatis.

HAB. Monte Suisha, leg. B. HAYATA, Mai. 1916.

Near *Anodendron læve*; but differs from it in the much smaller yellow flowers.

Loganiaceæ.

Gardneria WALL.

Gardneria Shimadai HAYATA sp. nov. Frutex, ramis et ramulis teretibus sublævibus fuscentibus, squamis triangularibus 2 mm. longis oppositis hac atque illac instructis. Folia opposita (jugis a se 3 cm. remotis) lanceolata chartacea $8\frac{1}{2}$ cm.–11 cm. longa 27–33 mm. lata apice obtuso-acuminata vel triangulari-acuminata basi obtusa margine integerrima tenuiter deorsum revurva utraque glaberrima supra viridissima subtus pallidissima, costa supra tenuiter elevata vel impressa subtus tenuiter prominente, venis lateralibus primariis utroque latere costæ 9–10 rectis a costa angulo 20–30° egressis ad medium furcatim ramosis utraque pagine tenuiter elevatis, petiolis 7 mm. longis supra late sulcatis. Flores ignoti. Cymæ fructiferae circ. 3 cm. longæ glabræ pauciramosæ, fructus 1–2 gerentes. Bacca globosa in exsiccato nigricans.

HAB. Tikushizan, leg. Y. SHIMADA, Mart. 1915, (fructus).

Near *Gardneria nutans* S. et Z., but differs from it in the much thicker leaves which are lanceolate and triangularly acuminate at the apex.

Gentianaceæ.

Swertia LINN.

Swertia shintenensis HAYATA sp. nov. Herba annua 45 cm. alta erecta medio sursum ramosa. Folia radicalia ignota. Folia caulina opposita oblongo-ovata 6 cm. longa 3 cm. lata apice acuminata basi rotundato-cordata sessilia caulem semi-amplexantia margine integerrima crassiuscula glabra, venis primariis lateralibus paucis, venulis reticulatis; foliis ramorum floriferorum minutis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis basi attenuatis ramos semi-amplexantibus oppositis glabris. Flores latissime cymosi, pedicellis 2-3 cm. longis. Calyx late campanulatus alte 4-lobatus, lobis semi-rotundato-triangularibus 4 mm. longis totiusque latis apice cuspidato-acutis vel acutis basi latissimis haud contractis obscure trinerviis glabris integris. Corolla campanulata altissime 4-fida, tubo 2 mm. longo, segmentis oblongis 17 mm. longis 9 mm. latis apice triangulari-acutis ad summum obtusis basi 3 mm. latis 5-nerviis vel obscure multi-nerviis, venulis reticulatis glabris intus medio 1-maculatis, maculis obtuse quadrangularibus $4\frac{1}{2}$ -5 mm. longis 4 mm. latis. Stamina 5 e basi loborum corollæ oriunda, filamentis dorso complanatis glabris linearibus 5-6 mm. longis basi latissimis 2 mm. latis sursum gradatim angustatis apice subulato-linearibus distincte 1-nerviis, antheris ovato-linearibus $4\frac{1}{2}$ mm. longis 2-2 $\frac{1}{2}$ mm. latis apice obtusis basi alte 2-lobatis, lobis 2 mm. longis. Ovarium cum stipite 7 mm. longum obovoideum plus minus complanatum $4\frac{1}{2}$ mm. latum, stipite circ. 2 mm. longo 3 mm. lato, stylo validissimo 4 mm. longo columnari-coniformi basi 3 mm. lato sursum angustiore apice stigmate 2-partito coronato; segmentis stigmatibus ovatis $1\frac{1}{2}$ mm. longis 1 mm. latis lamelliformibus horizontaliter dispositis.

HAB. in monte Shinten, 2400 ped. alt.; leg. U. FAURIE, Nov. 1914, (No. 1256).

Near *Swertia Kuroiwai* MAKINO.

Boragineæ.

Cordia LINN.

Cordia Kanehirai HAYATA sp. nov. Frutex? Ramuli fulvo-cinerascentes

hirsuti. Folia chartacea lanceolato-ovata vel lanceolata 9–14 cm. longa $2\frac{1}{2}$ –6 cm. lata apice acuminata versus summum lineari-acuminata basi acuta vel obtusa, costa supra minus subtus plus elevata, venis lateralibus primariis utroque latere costæ 5–6 arcuatis utraque elevatis, venis secundariis et venulis obscuris, margine remote serrulata vel subintegra, serrulis a se 7 mm. remotis apice interiore recurvis, utraque pagine hirsuta in exsiccatō supra fusca subtus pallidiora, petiolis 7–20 mm. longis. Cymæ terminales dense floratæ dense brevissime hirsutæ. Alabastrum floris: calyx-tubus cylindricus 4 mm. longus $2\frac{1}{2}$ mm. latus 10–sulcatus extus fulvo-hirsutus; lobis 5 minutis setuliformibus interiore recurvis. Corolla staminaque ignota. Bacca? ellipsoidea 13 mm. longa 8 mm. lata 1–pyrena; pyrenis oblique ellipticis utrinque obtusis grosse obtuseque spinoso-tuberculatis, testis crustaceis; semina ignota.

HAB. Kōshūn: Kuraru, leg. R. KANEHIRA, Jan. 1914, (No. 7).

Near *Cordia Cumingiana*.

Trigonotis STEV.

Trigonotis elevato-venosa HAYATA sp. nov. Herba humilis perennis cum pedunculis circ. 15 cm. longa erecta gracillima haud vel paucē ramosa in exsiccatō ferrugineo-hirsuta, stolonibus gracillimis 15–20 cm. longis. Folia radicalia longe petiolata perfecte elliptica 2– $2\frac{1}{2}$ cm. longa 10–13 mm. lata apice rotundata plus minus emarginata et ad centrum brevissime mucronata basi obtusa margine integra vel crispato-undulata supra viridia haud nitida subtus pallida, costa supra impressa subtus elevata, venis supra elevatis sed subtus impressis, utraque pagine adpresse pubescentia, venis lateralibus 4–5 rectis angulo 45° a costa egressis per venam marginalem conjunctis, venis marginalibus a margine 1–2 mm. distantibus, petiolis longissimis 3–4 cm. longis; foliis stolonis minoribus breve petiolatis rotundatis 8 mm. longis. Caulis apice 2-ramosus vel simplex apice ad racemos abeuns. Racemi graciles 8 cm. longi recti simplices vel rarius a basi furcatim uni-plo ramosi hirsuti, ramis simplicibus rectis erectis secunde floriferis, pedicellis hirsutis 2 mm. longis haud bracteatis. Calyx viridis 5-partitus, segmentis obovato-spathulatis apice obtusis extus strigoso-hirsutis intus minute hirsutis $1\frac{1}{2}$ mm. longis $\frac{1}{2}$ – $\frac{2}{3}$ mm. latis. Corolla alba rotata, tubo glabro $1\frac{1}{2}$ mm. longo $1\frac{1}{2}$ mm. lato basi truncato haud contracto, limbo 5-partito, segmentis rotundatis basi plus minus cuneato-

contractis $1\frac{1}{2}$ mm. in diametro glabris. Disci 5 ad basin loborum corollæ affixi flavi pulviniformes $\frac{1}{2}$ mm. lati $\frac{1}{4}$ mm. longi orem tubi fere obtegentes. Stamina 5, filamentis filiformibus brevissimis $\frac{1}{4}$ mm. longis, antheris oblongis $\frac{1}{3}$ – $\frac{1}{2}$ mm. longis. Ovarium obconicum apice truncatum $\frac{1}{4}$ mm. longum glabrum, stylo columniformi $\frac{2}{3}$ mm. longo, stigmate globoso-peltiformi haud lobato; ovarium 4–5-partitum. Nuculæ 4–5 tetrahedri-formes circ. 1 mm. longæ nitido-nigræ læves ad angulos acutæ.

HAB. Giran: Sōseikyaku, leg. B. HAYATA, Mai. 11, 1916.

Remarkable for the leaves with costa impressed above but elevated below, and veins elevated above but impressed below.

Convolvulaceæ.

Parasitipomæa HAYATA n. g.

***Parasitipomæa formosana* HAYATA sp. nov.** Parasitica aphylla; caulis tereto-filiformis circ. 1 m. longus 2 – $2\frac{1}{2}$ mm. in diametro. Flores cymose 2–3-congesti, cymis longe pedunculatis, pedunculis 10 cm. longis tereto-filiformibus lateraliter sitis, pedicellis $\frac{1}{2}$ –1 cm. longis basi bracteis instructis, bracteis linearibus 2 cm. longis 2 mm. latis apice acuminatis glabris vel multo minoribus. Calyx 5-partitus, partibus valde inæqualibus 3-exterioribus latioribus oblongo-linearibus $2\frac{1}{2}$ cm. longis 7 mm. latis apice acuminatissimis integris extus tenuiter hirsutis intus glabris, 2-interioribus angustissime linearibus 2 mm. latis apice acuminatissimis. Corolla infundibuliformis, tubo 4 cm. longo, limbo 5-lobato. Stamina 5, filamentis basi corollæ ad 5 mm. altitudinem affixis basi dense barbatis caeterum glabris filiformibus circ. 2 cm. longis, antheris linearibus $3\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis basi profunde 2-lobatis, lobis circ. 1 mm. longis $\frac{1}{4}$ mm. latis obtusis. Discus circum ovarium situs annuliformis $\frac{1}{4}$ mm. altus. Ovarium ovoideum $1\frac{1}{2}$ mm. longum glabrum 3-loculare, loculis 2-ovuliferis, stylo filiformi erecto recto 3 cm. longo, stigmate terminali 2-partito, partibus globosis sessilibus se contactis minute lamellato-botryoideis. Fructus ignotus.

HAB. Akō: Tanashū, leg. G. NAKAHARA, Jan. 1907.

Flowers are nearly the same as those of *Ipomœa*. But, its parasitic and leafless habit is so remarkable that it is sufficient to establish a new genus for it.

Scrophulariaceæ.

Microcarpæa R. BR.

Microcarpæa muscosa R. BR.; BENTH. Fl. Hongk. p. 253; HOOK. f. Fl. Brit. Ind. IV. p. 287; HEMSLEY. Ind. Fl. Sin. II. p. 192; MATSUM. et HAYATA Enum. Pl. Formos. p. 283. Herba minutissima subaquatica repens 3–4 cm. longa ad nodos radicans. Caulis teres $\frac{1}{2}$ mm. in diametro 1-nervatus glaber. Folia opposita glabra lineari-spathulata 2–3 mm. longa $\frac{1}{2}$ mm. lata apice obtusissima 1-nervia margine integra basi attenuata caulem semi-amplectantia. Flores axillares sessiles solitarii. Calyx erectus tubuloso-campanulatus 1 mm. longus $\frac{1}{2}$ mm. latus extus sparse hirsutus intus glaber apice 5-lobatus, lobis ovato-linearibus $\frac{1}{2}$ mm. longis $\frac{1}{4}$ mm. latis obtusis basi haud contractis margine ciliolatis. Corolla inclusa 1 mm. longa $\frac{1}{2}$ mm. lata 2-labiata glabra margine minute ciliolata intus sub microscopio glanduloso-hirsuta, labio superiore minuto $\frac{1}{4}$ mm. longo 2-lobato, lobis obtusis, labio inferiore majore $\frac{1}{2}$ mm. longo $\frac{2}{3}$ mm. lato 3-lobato, lobo medio oblongo-cuneato apice truncato, lobis lateralibus oblongis apice obtusis. Stamina 2 inter lobum centralem et lobos laterales labii inferioris inserta e medio tubi oriunda, filamentis $\frac{1}{4}$ mm. longis glabris, antheris reniformibus 2-locularibus. Ovarium oblongum $\frac{1}{3}$ mm. longum glabrum 2-loculare, stylo columniformi $\frac{1}{4}$ mm. longo glabro apice oblique truncato stigmatifero.


HAB. in oryzatis Tamsui, leg. U. FAURIE, Nov. 1914.

Compared with a Japanese specimen so named in the Herbarium at Tōkyō.

Gesneraceæ.

Rhychoglossum BLUME.

Rhychoglossum? Sasakii HAYATA sp. nov. Herba annua? basi ascendens radicans, radicibus fibrosis. Caulis erectus circ. 10 cm. longus crispato-hirsutus, pilis patentibus. Folia alterna breve petiolata obliqua ovato-oblonga $6\frac{1}{2}$ cm. longa 3 cm. lata apice acuta vel acuminata basi valde obliqua, latere inferiore rotundata vel rotundato-cordata, latere superiore cuneato-acuta, latere inferiore 20 mm. lato latere superiore 12 mm. lato, costa basi interiore

leviter falcato-recurva, margine subintegra vel obscure crenulato-serrulata membranacea supra plus subtus minus hirsuta, petiolis brevissimis 3 mm. longis. Flores racemosi, racemis subsimplicibus secunde floriferis, pedicellis 3 mm. longis hirsutis. Calyx 4-partitus plus minus obliquus, segmentis ovato-oblongis $2\frac{1}{2}$ mm. longis 2 mm. latis apice obtusissimis basi plus minus obliquis sparse hirsutis. Corolla oblique tubosa 9 mm. longa 3 mm. lata apice 2-labiata, labio superiore late semi-rotundato 1 mm. longo 2 mm. lato apice perfecte rotundato, labio inferiore $3\frac{1}{2}$ mm. longo $4-4\frac{1}{2}$ mm. lato 3-lobato, lobis lateralibus oblongis latere exteriore 2 mm. longis latere interiore 1 mm. longis basi haud contractis, lobo terminali 2 mm. longo $1\frac{1}{2}$ mm. lato, extus glabra intus latere inferiore longe hirsuta, pilis superioribus circ. 1 mm. longis apice globuliferis, pilis inferioribus haud globuliferis. Stamina 4 basi corollæ affixa, filamentis 3 mm. longis basi glabris sursum hirsutis complanatis $\frac{1}{4}$ mm. latis apice spathulatis 1-nerviis margine dense hirsutis; antheræ uniloculares, loculis ad apicem filamentorum oblique sitis -formibus cordato-reniformibus latere exteriore fusco-hirsuto latere interiore glabro. Ovarium depresso-globosum $1\frac{1}{2}$ mm. longum 2 mm. latum glabrum, stylo $1\frac{1}{2}$ mm. longo columniformi apice dilatato 3-lobato. Discus ad latus anterius ovarii situs $\frac{1}{4}$ mm. longus 1 mm. latus crenulatus. Capsula depresso-globosa $2\frac{1}{2}$ mm. longa $3\frac{1}{2}$ mm. lata membranacea. Semina fusiformia rubescentia $\frac{1}{8}$ mm. longa eleganter tortuose striata, testa crustacea.

HAB. Urai, leg. S. SASAKI, Sept. 1915.

As the specimens are too imperfect, the generic determination is rather conjectural.

Verbenaceæ.

Callicarpa LINN.

Callicarpa antacensis HAYATA sp. nov. Frutex? Rami sublæves pallido-cinerascentes, ramulis brevissime densissime villosis. Folia chartacea oblonga vel rhomboideo-oblonga 10–12 cm. longa 5–7 cm. lata apice acuta sed ad summum obtusa basi triangulari-acuta vel -obtusa margine subintegra vel tenuiter serrulata paucissime hirsuta vel subglabrata glandulis minutis dispersa subtus dense vel parce stellato-tomentosa, pilis stellatis $\frac{1}{3}$ mm. in diametro, costa supra tenuiter subtus prominente elevata, venis lateralibus

primariis utroque latere costæ 8-9 subrectis vel plus minus recurvis supra tenuiter subtus prominente elevatis, venulis inter venas transversis supra haud subtus distincte elevatis, pagine subtus pallidissima glandulis flavis minutis densissime conspersa, petiolis 7 mm. longis dense brevique stellato-tomentosis. Cymæ ad axillas foliorum superiorum sitæ densissime floratæ brevissime stellato-tomentosæ, tomentis demum solutis, pedicellis brevissimis supra basin articulatis, partibus supra articulationem 1 mm. longis glabris apice ad calycem abeuntibus. Calyx tubuloso-obconicus $1\frac{1}{2}$ mm. longus totiusque latus apice subtruncatus margine 4-5-dentatus, dentibus brevissimis vel obscuris, extus glandulis minutis conspersus intus glaber. Corolla tubuloso-campanulata $4\frac{1}{2}$ -5 mm. longa $2\frac{1}{2}$ mm. lata generaliter 4-lobata, lobis subrotundatis $1\frac{1}{2}$ mm. longis totiusque latis apice rotundatis basi haud contractis, extus intusque glabra. Stamina 4 exserta, filamentis filiformibus glabris 4-5 mm. longis subcrispatis supra basin corollæ insertis, antheris ellipticis 2 mm. longis 1 mm. latis dorso valde compressis apice emarginatis basi emarginato-sagittatis dorso facieque prope medium densissime glandulis minutis conspersis, haud versatilibus. Ovarium oblongum 1 mm. longum $\frac{2}{3}$ mm. latum glandulis minutis densissime conspersum, stylis 7-8 mm. longis filiformibus glabris apice ad stigmata dilatatis.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912, fl. (No. 38).

Near *Callicarpa cana* LINN.; but differs from it in having obtusely serrulate leaves.

Aristolochiaceæ.

Aristolochia LINN.

***Aristolochia Shimadai* HAYATA** sp. nov. Herba volubilis basi suffrutescens. Caulis subglaber teres tortuosus multo-striato-sulcatus sursum patentohirsutus. Folia alterna petiolata oblongo-reniformia circ. 10 cm. longa circ. 6 cm. lata, partibus superioribus oblongis 6 cm. longis circ. 4 cm. latis apice obtusissimis, partibus inferioribus reniformibus 4 cm. longis $5\frac{1}{2}$ mm. latis, basi auriculata, auriculis interiore recurvis (ab apice petioli usque ad apicem auriculæ $1\frac{1}{2}$ cm. longis 2 cm. latis) margine subintegra 5-7-nervia chartacea, nervis et venis venulis supra leviter elevatis subtus valde elevatis, supra minus subtus

plus dense villosa, venulis reticulatis, petiolis circ. 3 cm. longis villosis. Flores axillares solitarii, pedicellis 2-3 cm. longis villosis medio 1-bracteatis, bracteis ovatis apice obtusissimis basi latis pedicellum amplexantibus 5 mm. longis 4 mm. latis extus sericeo-villosis intus subglabris. Ovarium inferum subnutans densissime patentissime villosum (pilis 1 mm. longis) 8 mm. longum 2 mm. latum profunde 6-sulcatum 6-loculare, (loculis 1-seriatim ovuliferis), sulcis $\frac{1}{4}$ mm. latis, angulis obtusissimis in sectione rotundatis. Perianthium ν -formiter recurvum extus minute brevissime villosum simul longe hirsutum intus deorsum minute tuberculatum sursum glabrum læve, tubo U-formi 2 cm. longo e basi supra medium 6 mm. lato supra medium usque ad apicem angustato 3-4 mm. lato, limbo ad apicem tubi oblique verticaliter sito $1\frac{1}{2}$ cm. longo totiusque lato plano parce minuteque hirsuto ∇ -formi centro circum orem tubi oblique minute elevato-annulato reticulato. Stamina 6 cum styli connata sessilia, antheris linearibus inter strias stigmatiferas styli geminatis sitis 2 mm. longis $\frac{2}{3}$ mm. latis apice brevissime apiculatis. Stylus columniformis crassus 3 mm. longus cum antheris $1\frac{1}{2}$ mm. crassus apice 3-lobatus supra antheras 1 mm. productus, lobis semi-rotundatis 1 mm. longis $1\frac{1}{2}$ mm. latis.

HAB. Shimpō, Shinchikuchō, leg. Y. SHIMADA, Dec. 15, 1915.

Near *Aristolochia Kämpferi* WILLD., but distinguishable from it in much longer leaves and smaller flowers. Also resembles *A. Fordiana* HEMSL., but differs from it in having quite obtuse leaves.

Laurineæ.

Beilschmiedia NEES.

Beilschmiedia erythrophloia HAYATA Ic. Pl. Formos. IV. p. 20 et V. p. 150. Descriptio aucta: Flores pallido-flavescentes laxè paniculati; paniculis ad ramulos hornotinos lateraliter vel axillariter dispositis divaricatis cum pedunculis 6-8 cm. longis (pedunculis 2-3 cm. longis), ramis panicularum patentissimis, pedicellis ultimis 5-10 mm. longis toto glabris. Perianthii tubus obconicus $\frac{2}{3}$ mm. longus $1\frac{1}{2}$ mm. in diametro glaber, lobis 6 subæqualibus oblongis 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi vix vel haud contractis extus glabris intus glabris concavis margine vix ciliolatis vel haud ciliolatis. Stamina ordinis I. et II. æqualia, filamentis late linearibus $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm.

latis complanatis, antheris adnatis ovatis 2-locularibus $\frac{2}{3}$ mm. longis apice obtusis introrsum dehiscentibus; stamina ordinis III. filamentis plus minus hirsutis basi utroque latere glandulis rotundatis $\frac{1}{4}$ mm. longis totiusque latis instructis, antheris elongato-ovatis $\frac{2}{3}$ mm. latis; ordinis IV. staminodia sessilia rhomboidea acuta $\frac{1}{2}$ mm. longaque lata. Ovarium ovoideum $\frac{2}{3}$ mm. longum et latum glabrum 1-loculare, stylo columniformi glabro 1 mm. longo apice truncato stigmatoso.

HAB. Baikai, ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Thymelæaceæ.

Wikstrœmia ENDL.

Wikstrœmia mononectaria HAYATA Ic. Pl. Formos. V. p. 179. Descriptio aucta: Fructus baccæformis ovoideus cum stipitibus 6 mm. longus 3 mm. latus apice angustatus ad summum obtusus basi attenuatus ad stipitem abeuns, stipitibus circ. $1\frac{1}{2}$ –2 mm. longis, monospermus. Semina ovoidea 4 mm. longa 2– $2\frac{1}{2}$ mm. lata apice plus minus angustato-rostrata obtusa basi rotundata et brevissime apiculata, testa crustacea nigricanti latere uno hilo notata, albumen carnosum sparsum. Embryo amplius; radícula supra brevis 1 mm. longa apice acutissima; cotyledonibus ovatis $2\frac{1}{2}$ –3 mm. longis $1\frac{2}{3}$ mm. latis crassiusculis.

HAB. Uraisha, leg. S. SASAKI, Sept. 1915, (fr.).

Loranthaceæ.

Loranthus LINN.

Loranthus liquidambaricolus HAYATA sp. nov. Frutex parasiticus ad truncos *Liquidambaris* incolus, ramis cinerascentibus minute lenticellatis. Folia crasse coriacea oblonga vel ovato-oblonga 7 cm. longa 4 cm. lata apice truncato-rotundata basi acuta subito ad petiolum abeuntia, costis et venis utraque pagine tenuissime elevatis gracillimis, petiolis 12 mm. longis subalatis haud sulcatis subteretibus. Cymæ laterales 3-floratæ. Tubus perianthii cylindricus 18 mm. longus 3 mm. latus basi truncatus medio sursum gradatim angustior apice plus minus expansus, ab apice deorsum usque ad 5 mm. latere uno fissus extus brevissime hirsutus intus subglaber; lobis 4 linearibus 6 mm. longis $1\frac{1}{2}$ mm. latis

apice obtusis retrorse flexis tubo contactis apice sursum (interiore) recurvis valvatis crassiusculis basi haud contractis. Stamina 4 lobis perianthii opposita, filamentis totis cum tubo perianthii connatis; antheris sessilibus linearibus $4\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice acutis apice 2-dentatis, (dentibus triangularibus brevissimis), loculis linearibus a medio deorsum recurvis subglabris. Stylus 23 mm. longus filiformis in sectione pentagonus glaber, stigmate terminali coniformi. Fructus obconico-cylindricus 6 mm. longus 3 mm. in diametro sectionis.

HAB. Nantō: kyōshiryō, leg. T. SōMA, Nov. 1915, ad truncos *Liquidambaris formosanae* crescens.

Loranthus Owatarii HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 357. Descriptio aucta: Flores ♂: lacteo-flavi patentissimi circum nodos spicae 4-glomeratim siti sessiles, bracteis triangularibus 1 mm. longis acutis transverse patentibus. Involucrum cupuliforme $1\frac{1}{2}$ mm. in diametro $\frac{2}{3}$ mm. longum margine sub lente minute denticulatum vel sub-integrum. Perianthii segmenta 6 patentissima linearia oblanceolata $2\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata apice obtusa vel truncata glabra lævia distincta. Stamina 6 cum segmentis opposita, filamentis basi ad basin segmentorum adnatis sursum liberis $2-2\frac{1}{2}$ mm. longis cum segmento æquilongis glabris incrassatis, antheris oblongis adnatis apice truncatis vel emarginatis 4-locularibus, loculis operculatim dehiscentibus. Rudimentum ovarii brevissimum margine 5-dentatum, stylo columnari $1\frac{1}{2}$ mm. longo.

HAB. Oiwake, ad 7500 ped. alt., ad truncos *Qurci Morii*, Aprili. 1916, leg. B. HAYATA.

Viscum LINN.

Viscum Alni-formosanae HAYATA sp. nov. (Fig. 3.) Furcatim ramosissimum, ramis patentissimis teretibus rectis. Folia ad apicem ramulorum oppositam sita oblongo-obovata 4-5 cm. longa 12-18 mm. lata apice rotundata basi longe cuneato-attenuata integra crassiuscule coriacea 3-5-nervia sessilia vel breve petiolata. Cymæ terminales sessiles 5 mm.-10 mm. longæ ternatim decussatimque ramosæ, floribus sessilibus cum rhachibus flavescentibus. Flores basiales utroque latere bracteis acute triangularibus $1-1\frac{1}{2}$ mm. longis margine aristato-serrulatis dorso carinatis crassiusculis glabris instructi, laterales et

terminales haud bracteati, sed involucris crustaceis instructi. Perianthium campanulatum $2\frac{1}{2}$ –3 mm. longum $3\frac{1}{2}$ –4 mm. latum crassiusculum coriaceum glabrum; tubo $1\frac{1}{2}$ –2 mm. longo obconico, lobis rotundato-triangularibus vel oblongo-triangularibus 2 mm. longis totiusque latis vel latoribus apice exteriore recurvis glabris; antheris 3–4 cum lobis perianthii oppositis et eos adnatis oblongis vel oblongo-linearibus $1\frac{1}{2}$ –2 mm. longis facie multiporosis; rudimentum ovarii nullum. Fl. ♀: sessiles vel brevissime stipitati; ovarium viride inferum obconico-lineare 1 – $1\frac{1}{2}$ mm. longum 1 mm. latum glabrum; perianthium 4-partitum, segmentis oblongo-triangularibus glabris incrassatis coriaceis apice obtusis basi articulatim solutis; stamina nulla; stylus

globosus 1 mm. longus totiusque latus apice rotundatus stigmatosus.

HAB. Musha: Tsutsujigaoka, ad 6000 ped. alt., ad *Alnum formosanum* crescens, leg. B. HAYATA, Aprili. 23, 1916.

Approaches to *Viscum album* LINN., but differs from it in the male flowers

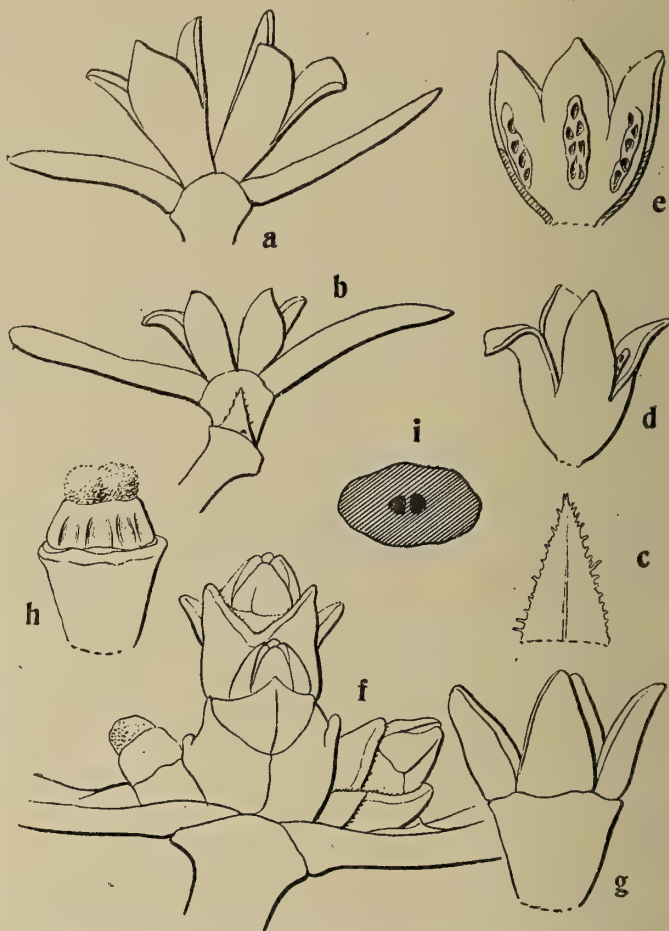


Fig. 3, *Viscum Alni-formosanæ* HAYATA. a, b, pairs of male flowers; c, a bract; d, a male flower; e, section of the same; f, female flower-cluster; g, a flower of the same; h, the same, perianth off; i, section of ovary.

which are usually in pair at the top of the branches, and in the much narrower perianth-segments of the same flowers.

Viscum diospyrosicolum HAYATA Ic. Pl. Formos. V. p. 192. Descriptio aucta: Juvenile foliiferum, foliis oppositis oblongo-obovatis $1\frac{1}{2}$ cm. longis $4\frac{1}{2}$ mm. latis apice obtusissimis basi cuneatis margine integris chartaceis glabris venis haud visis sessilibus. Fl. ♂: involucrium tenuiter crustaceum cupuliforme margine obscure denticulatum. Perianthium circ. ad basin 4-lobatum, lobis oblongo-triangularibus $1\frac{1}{4}$ mm. longis $\frac{3}{4}$ mm. latis apice acutis basi haud contractis crassiusculis leviter deorsum reflexis extus minute sub lente botryoideo-tuberculatis glabris. Antheræ 4 ad medium lorum perianthii adnatæ oblongæ 5-6-porosæ. Rudimentum ovarii nullum. Pseudofructus ellipsoideus $4\frac{1}{2}$ mm. longus 2 mm. latus apice obtusus ad centrum summi breve apiculatus lævis.

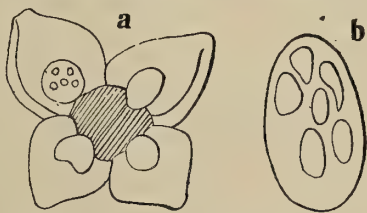


Fig. 4, *Viscum diospyrosicolum* HAYATA; a, a male flower; b, an anther.

HAB. Kyōshiryō, leg. B. HAYATA, 2200 ped. alt., Aprili. 1916, (fl. ♂).

Euphorbiaceæ.

Daphniphyllum BLUME.

Daphniphyllum membranaceum HAYATA sp. nov. Arbor, ramis et ramulis validiusculis cicatricibus foliorum notatis haud lenticellatis. Folia alterna versus apicem ramulorum approximativè disposita longe petiolata oblongo-elliptica vel oblongo-lanceolata circ. 20 cm. longa 6 cm. lata apice acutissima vel breve cuspidata basi obtusa margine subintegra supra nitida viridissima subtus glauca chartacea vel chartaceo-membranacea, costa supra plana vel tenuiter impressa subtus prominenti, venis lateralibus primariis utroque latere costæ 15-20 rectis vel plus minus flexuosis haud arcuatis gracillimis utroque pagine tenuiter elevatis a costa angulo 45° egressis, petiolis circ. 5 cm. longis rectis supra sulcatis basi plus minus dilatatis. Racemi florum ♀ versus apicem ramorum sub foliis supra cicatrices foliorum dispositi gracillimi glabri erecti recti 12 cm. longi laxissime floriferi, pedunculis 5-6 cm. longis, pedicellis gracillimis glabris 2 cm. longis divaricatissimis, bracteis

caducissimis haud visis. Flores ♀: perianthii segmenta interdum complete ad nullum reducta, vel interdum brevissima glandulæformia 7-8 apice peltato-truncata $\frac{1}{4}$ mm. longa totiusque lata distincta. Ovarium glabrum oblongum glabrum 2 mm. longum apice ad stylum $\frac{2}{3}$ mm. longum attenuatum basi obtusum, stigmate terminali subpeltato 2-fido, segmentis latissimis $\frac{2}{3}$ mm. longis subrotundatis ad apicem styli contactis, ovarium 2-loculare.

HAB. Rankanzan, leg. B. HAYATA, Mai. 1916.

Near *D. macropodum*, but different from it in the much thinner leaves, in the more or less rostrate ovaries and nearly obsolete perianth-segments.

Cyclostemon BLUME.

Cyclostemon hieranense HAYATA sp. nov. Arbor? ramis et ramulis gracilibus, cortice cinerascenti, lenticellis albicantibus minutis elevatis. Folia alterna in exsiccatto pallido-cinerascentia tenuiter coriacea oblongo-elliptica vel oblongo-lanceolata apice caudato-acuminata basi oblique acuta 12 cm. longa 4 cm. lata margine integra tenuiter deorsum recurva plus minus margine crispato-undulata, costa utraque elevata, venis venulis reticulatis supra minus subtus plus elevatis, venis primariis lateralibus utroque latere costæ 8-10 tenuissimis arcuatis prope marginem reticulatis, utraque pagine glaberrima, petiolis 8 mm. longis semiteretibus fusco-coloratis. Flores ad partes inferiores efoliatis ramurorum hornotinorum lateraliter siti ad nodos 2-3-fasciculati graciliter pedicellati, pedicellis filiformibus 1 cm. longis, bracteis flores 2-3 includentibus caducissimis rotundatis apice triangularibus 7 mm. longis 6 mm. latis dense ciliatis coriaceis valde concavis. Sepala 4 patentia rotundata glabra 4 mm. longa 3 mm. lata apice rotundata margine ciliata. Stamina 7-10 circum rudimentum ovarii disposita, filamentis glabris $1\frac{1}{2}$ mm. longis, antheris oblongis utrinque emarginatis $1\frac{1}{2}$ mm. longis 1 mm. latis. Rudimentum ovarii plano-compressum $2\frac{1}{2}$ mm. in diametro margine repando-lamellatum plicatum. Fl. ♀ ignoti.

HAB. Hieranzan, leg. S. SASAKI, Feb. 1912.

Near *C. karapinense*; but differs from it by the much more acuminate and thicker leaves.

Urticaceæ.

Fleurya GAUDICH.

Fleurya interrupta GAUD. ; MATSUM. et HAYATA Enum. Pl. Formos. p. 381. Herba annua ? radicibus fibrosis. Caulis subteres 30–40 cm. longus sparse hirsutus. Folia alterna petiolata triangulari-cordata membranacea 9–10 cm. longa 7–8 cm. lata apice triangulari-acuminata (acuminibus integris linearibus 1 cm. longis 3 mm. latis apice acutis) basi late truncata vel truncato-cordata margine grosse serrata, (serris sub-triangularibus 4 mm. longis 6 mm. latis apice acutis basi latissimis superioribus gradatim minoribus) margine brevissime ciliolata trinervia, nervis lateralibus extrorse 5-veniferis, venis et nervis prope serras furcatim ramosis, ramulis ad apicem serrarum convergentibus, utraque sparse hirsuta, petiolis 7–9 cm. longis gracillimis hirsutis vel subglabris, stipulis 2 subaxillaribus lineari-filiformibus circ. 1 cm. longis basi 1 mm. latis apice filiforme acuminatis dorso prominente carinatis intus glabris extus hirsutis. Spicæ a basi usque ad apicem caulis sitæ axillares solitariæ longe pedunculatæ cum pedunculis 8–10 cm. longæ, (pedunculis circ. 5 cm. longis gracillimis ascendentibus), pauce ramosæ, ramis spicæ circ. 5 mm. longis remote sitis. Flores ♀ ad ramos spicæ densissime cymose glomeratimque dispositi, pedicellis subnullis vel $\frac{1}{2}$ mm. longis. Perianthium fructiferum oblique globoso-obconicum 1 mm. longum totiusque latum glabrum vel sparse hirsutum inæqualiter 4-lobatum, lobis subtriangularibus $\frac{1}{2}$ mm. latis $\frac{1}{3}$ mm. longis margine denticulatis; staminodia nulla. Styli ad apicem ovarii oblique siti a basi 2-partiti, parte una longiore filiformi $\frac{2}{3}$ mm. longa rubescenti descendento-recurva, parte una brevissima $\frac{1}{10}$ mm. longa vel obsoleta. Achænium valde complanatum triangulari-cordiforme $1\frac{1}{2}$ mm. longum 1 mm. latum sublævè angustissime alatum, pericarpiis crustaceis.

HAB. Akō, leg. T. SōMA, Sept. 1913, (fr. et ♀).

Pilea LINN.

Pilea brevicornuta HAYATA sp. nov. (Fig. 5.) Herba; caulis basi procumbens ad nodos radicans, (radicibus fibrosis), sursum ascendens erectus sursum foliatus hirsutus (pilis horizontaliter patentibus $\frac{1}{2}$ mm. longis) simul glanduloso-rubro-punctatis. Folia opposita (jugis a se 2 cm. distantibus),

longe petiolata ovato-oblonga vel ovato-lanceolata $4\frac{1}{2}$ cm. longa 18 mm. lata apice acuminata basi triangulari-acuta vel obtusa margine basi apiceque excepto serrata (serris ascendentibus late triangularibus obtusis a se 3 mm. distantibus), trinervia, (nervis lateralibus ad apicem serrarum attingentibus), venis lateralibus primariis nervorum sub apicibus serrarum glandula singula calcarea terminatis, pagina supra cystolithis $\frac{6}{10}$ mm. longis rectis conspersa subtus glabra, petiolis 6–7 mm. longis glabris supra sulcatis, stipulis intra-axillaribus castaneis membranaceis ovato-oblongis $4\frac{1}{2}$ mm. longis 3 mm. latis apice obtusissimis basi caulem semi-amplexantibus glabris. Flores monœcii vel diœcii. Fl. ♂ cymosi, cymis solitariis vel geminatis axillaribus pedunculatis, pedunculis glabris $1\frac{1}{2}$ –2 cm. longis apice ramosis plus minus hirsutis ad nodos bracteatis, bracteis oblongis 1 mm. longis apice erosis, pedicellis ultimis $\frac{2}{3}$ mm. longis. Perianthium



Fig. 3, *Pilea brevicornuta* HAYATA; a, b, male flowers; c, a stamen; d, a female flower.

rubescens 4-lobatum, tubo obconico 1 mm. lato glabro, lobis oblongis 2 mm. longis $1\frac{1}{3}$ mm. latis apice cornuto-acutis glabris basi non contractis intus plus minus concavis glabris. Stamina 4, filamentis 2 mm. longis linearibus $\frac{1}{3}$ mm. latis; antheris roseis, loculis divaricatis. Rudimentum ovarii minutum setiforme. Flores ♀ cymosi, cymis brevioribus inferioribus quam iis floris ♂, breve pedunculatis cum pedunculis $\frac{1}{2}$ cm. longis generaliter geminatim ad axillas foliorum sitis glabris bracteatis ramosissimis, floribus ad nodos glomeratis bracteatis, bracteis oblongo-triangularibus basi pedicelli ultimi sitis minutis $\frac{1}{4}$ mm. longis, pedicellis ultimis $\frac{1}{2}$ – $\frac{2}{3}$ mm. longis. Perianthium fructiferum viride 3-partitum, segmentis inæqualibus, postico longiore oblongo $\frac{1}{2}$ mm. longo glabro intus concavo apice truncato vel obtusissimo, segmentis lateralibus ovato-triangularibus $\frac{1}{3}$ mm. longis apice acutis intus valde concavis glabris; rudimenta staminum 3 crassiuscula $\frac{2}{3}$ mm. longa Ω -forme recurva. Achænium castaneum ovatum $\frac{3}{4}$ mm. longum $\frac{1}{2}$ mm. latum biconvexum apice obtusissimum basi con-

tractum, (stigmatē sessili infra apicem ovarii latere sito brevissime pectinato) rubescens rubro-punctatum, pericarpio coriaceo-crustaceo. Semina ovata utrinque acuta, testa membranacea. Embryo ignotus.

HAB. Mt. Arisan: inter Heishana et Nimandaira, Mart. 1914, leg. B. HAYATA.

Near *Pilea umbrosa* WEDD., but differs from it by the leaves which are usually acute at the base.

Pilea funkikensis HAYATA sp. nov. Herba subsucculenta altissima erecta aggregatim abundante crescens. Caulis 60–200 cm. altus vel altior glaber simplex haud ramosus subtetragonus 4 mm. crassus medio sursum foliatus erectus. Folia opposita (jugis a se 3–5 cm. remotis) longe petiolata in exsiccatō chartacea in vivo crassiuscula elongato-ovato-oblonga vel elongato-oblonga 12–14 cm. longa $4\frac{1}{2}$ –5 cm. lata apice breve caudato-acuta (acuminibus 1 cm. longis) basi cuneato-obtusa obtusa vel rotundata margine tenuiter remoteque serrulata (serrulis ascendentibus ab apice ad apicem 5 mm. distantibus) trinervia, nervis supra impressis subtus elevatis, pagine supra dense subtus minus dense cystolithis vermiformibus conspersa, cystolithis $\frac{1}{5}$ – $\frac{2}{5}$ mm. longis, petiolis 3–6 cm. longis glabris, stipulis intra-axillaribus non satis notis. Flores diœcii vel monœcii, (si monœcii tunc inflorescentiæ floris fœminei superiores, inflorescentiæ floris masculini inferiores). Flores toto cymosi, cymis axillaribus solitariis vel geminatis. Cymæ floris ♂: quam eæ fl. ♀ longiores et plus expansæ 3–5 cm. longæ 2–4 cm. latæ sessiles vel breve pedunculatæ ramosissimæ glabræ ad nodos glomeratim dense floriferæ ad nodos bracteatae, bracteis late triangularibus 1 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi haud contractis glabris; flores 10–30 ad nodos glomerati sessiles basi 1-bracteati, bracteis oblongis $1\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis vel minoribus apice acutis glabris; alabastrum floris ♂ obovoideum $1\frac{1}{2}$ mm. latum apice cornibus erectis brevissimis segmentorum breve apiculatum glabrum; apertientes leviter rosei. Perianthium campanulatum, tubo 1 mm. in diametro intus cupulæformi, 4-lobatum, lobis oblongis 1 mm. longis $\frac{2}{3}$ mm. latis apice minute inflexis triangulari-acutis basi haud contractis intus valde concavis extus dorso infra apicem brevissime cornutis, cornibus erectis minutissimis triangulari-acutis; stamina 4 lobis perianthii opposita e basi loborum oriunda, filamentis lineari-

bus glabris $1\frac{1}{2}$ mm. longis quam labo plus minus longioribus in alabastro inflexis, antheris oblongis dorso infra apicem glandula singula $\frac{1}{6}$ mm. longa retrorse elevata rubra instructis; rudimentum ovarii conicum minutissimum. Cymæ floris ♀ quam cæ fl. ♂ breviores superiores $1-1\frac{1}{2}$ cm. longæ totiusque latæ sessiles vel breve pedunculatæ; flores ad nodos densissime glomerati; perianthium achæniferum 2-4-partitum vel lobatum, segmentis linearibus vel quadrangularibus $\frac{2}{3}-\frac{1}{2}$ mm. longis margine crosis apice truncatis haud cornutis glabris; rudimenta staminis 2 vel 4, filamentis ad nullum reductis, antheris abortis sessilibus minutissimis quadrangularibus $\frac{1}{10}-\frac{1}{6}$ mm. longis. Achænium oblongum plus minus obliquum $1\frac{1}{4}$ mm. longum $\frac{2}{3}$ mm. latum apice brevissime et lateque apiculatum ad summum stigmatē terminatum basi contractum acutum brevissime stipitatum biconvexum complanatum lentiforme læve minute rubropunctatum, maturum ignotum; embryo ignotus.

HAB. Mt. Arisan: inter Toroyen et Funkiko, leg. B. HAYATA et TAKEO ITÔ, Mart. 1914; Nimandaira, leg. T. SÔMA, Jan. 1915.

Near *Pilea petiolaris* BLUME, but differs from it in having much longer and thicker leaves.

Pilea kankaoensis HAYATA sp. nov. Annua. Caulis 15-25 cm. longus succulentus glaber deorsum efoliatus sursum foliatus 5 mm. in diametro sectionis. Folia versus apicem caulis oppositim disposita a se 3-2-1 cm. distantia longe petiolata ovato-oblonga vel obovato-oblonga $2\frac{1}{2}-5$ cm. longa $1\frac{1}{2}-2\frac{1}{2}$ cm. lata apice caudata ad summum caudæ obtusissima basi obtusissima rotundata vel truncata sed ad apicem petioli semper minute cordata \curvearrowright -formia margine integerrima crassiuscula plus minus succulenta supra fusco-viridia plus minus iridescentia supra cystolithis vermiformibus $\frac{1}{2}-\frac{3}{5}$ mm. longis conspersa subtus in exsiccato alveoli-forme elevato-reticulata in vivo haud reticulata glaberrima 3-nervia, nervis in exsiccato supra impressis subtus tenuissime elevatis gracillimis, nervo centrali ad acumen ipsum extenso, nervis lateralibus a margine 2-3 mm. distantibus margini parallelis sursum gradatim evanescentibus, venis transverse dispositis tenuissimis; petiolis 2-3 cm. longis teretibus cystolithis conspersis, stipulis intra-axillaribus latere interiore se connatis late triangularibus apice acutis vel obtusis 1 mm. longis 2 mm. latis. Flores monœcii corymboso-paniculati; paniculis ad folia superiora axillaribus cum

pedunculis 8–10 cm. longis, pedunculis 6–7 cm. longis, ramis paniculæ pedato-patentibus glabris, rhachibus valde flexuosis glabris incrassatis ad nodos flores quasi-glomeratim gerentibus. Fl. ♂: sessiles; alabastrum obovoideo-globosum apice obtuse truncatum cornibus 4 brevissimis instructum basi obtusum; flores apertientes patentissimi, perianthii lobis oblongo-linearibus $1\frac{1}{2}$ mm. longis 1 mm. latis apice acutis dorso sub apice brevissime cornutis utraque pagine glabris distincte 1-costatis; stamina 4, lobis perianthii opposita, filamentis ad $\frac{1}{2}$ mm. perianthio adnatis sursum liberis, partibus liberis 1 mm. longis cum lobis perianthii æquilongis complanatis glabris inflexis, antheris ovatis apice emarginatis basi profunde cordatis vel profunde 2-lobatis 1 mm. longis. Fl. ♀: pedicelli $\frac{1}{8}$ – $\frac{1}{10}$ mm. longi brevissimi basi 1-bracteati, bracteis triangulari-ovatis $\frac{1}{4}$ mm. longis obtusis vel breve 2-lobatis glabris; perianthium 4-partitum, segmentis valde inæqualibus, uno majore erecto concavo crassiusculo, alteris lanceolatis tenuissimis hyalinis $\frac{1}{3}$ mm. longis acuminatis; staminodia nulla; ovarium obovoideo-ellipsoideum stigmate excepto $\frac{1}{3}$ mm. longum glabrum 1-loculare 1-ovulatum, ovulis erectis, stigmate sessili pectinato-cristato; achænium oblique ovato-oblongum apice obtusum plus minus recurvum basi cuneato-acutum glabrum minus quam 1 mm. longum $\frac{1}{2}$ mm. latum latere plus minus complanatum biconvexum, pericarpio fulvescenti crustaceo. Semina ovoidea $\frac{2}{3}$ mm. longa apice acuta basi rotundata plus minus complanata lævia glabra, testa membranacea; albumen paucum; embryo mediocrius subovatus $\frac{1}{3}$ mm. longus; radicula supra brevis dimidium cotyledonis in longitudine æquans coniformis apice obtusa; cotyledones late rotundatæ latiores quam longæ.

HAB. Kōshūn: Kankao, leg. Z. KOBAYASHI, Juli. 1907, fl. ♂ (No. 5616); ibidem, leg. S. KAWAGOI, Oct. 1914, (fl. ♀ et fructus).

Near *P. lancifolia* HOOK. f.

Pilea minute-pilosa HAYATA sp. nov. Herba subsucculenta humilis 10–15 cm. alta. Caulis erectus basi pauce ramosus a basi sursum foliatus glaber. Folia opposita parva elliptico-ovata vel oblonga maxima $5\frac{1}{2}$ cm. longa 2 cm. lata apice caudato-acuminata (acuminibus 1 cm. longis ad summum obtusis) basi obtusissima vel rotundata ad extremitatem basis minute cordata Λ -formia margine subintegra vel obscure minuteque crenulata in exsiccatō membranacea in vivo crassiuscula 3-nervia, nervis lateralibus cum margine

parallelis prope basin acuminis evanescentibus, nervis supra impressis subtus elevatis, pagine supra (nervis exceptis) cystolithis minutissimis $\frac{3}{5}$ – $\frac{1}{6}$ mm. longis densissime conspersa subtus toto glabra, petiolis maximis $1\frac{1}{2}$ cm. longis teretibus glabris, stipulis triangularibus minutis axillaribus. Flores dioecii, masculini ignoti. Fl. fœminei cymosi, cymis gracilibus glabris ad folia superiora axillaribus pedunculatis cum pedunculis 3–4 cm. longis ramosis ad nodos glomeratim floratis, ad nodos bracteatis, bracteis triangularibus minutissimis $\frac{1}{6}$ mm. longis obtusis; flores brevissime pedicellati, pedicellis $\frac{2}{5}$ mm. longis apice peltato-dilatatis cum flore articulatis, peltis fulvo-flavis; segmenta perianthii minutissima ignota. Achænium fusco-rubescens ovatum obliquum complanatum lentiforme utrinque acutum muricatum. Semina conico-ovata apice acuta basi rotundata complanata $\frac{3}{5}$ mm. longa $\frac{1}{2}$ – $\frac{2}{3}$ mm. lata, testa membranacea castanea; albumen paucum; embryo conico-ovatus complanatus $\frac{1}{2}$ – $\frac{3}{5}$ mm. longus $\frac{2}{5}$ mm. latus apice acutus basi rotundatus; radícula coniformi apice acuta $\frac{6}{5}$ mm. longa cotyledones in longitudine æquans; cotyledonibus late rotundatis $\frac{6}{5}$ mm. longis $\frac{2}{5}$ mm. latis.

HAB. Pokupokusha, leg. U. MORI, Jun. 1912.

Differs from *P. kankaoensis* HAY., in having smaller leaves with much smaller vermiformed cystolithes on the upper surface.

Pilea ovatinucula HAYATA sp. nov. Herba subsucculenta 40–60 cm. longa glaberrima. Caulis erectus rectus sursum foliatus. Folia tenuissime membranacea ovato-oblonga vel ovato-lanceolata, mediocria 11 cm. longa 4 cm. lata apice acuminata, acuminibus linearibus $1\frac{1}{2}$ cm. longis 1–2 mm. latis ad summum obtusis, basi semper obtusa margine (basi acumineque integro excepto) serrulata, serrulis ascendentibus obtusis a se 4 mm. remotis brevissimis, 3–nervia, nervis supra tenuiter impressis subtus elevatis, utraque pagine cystolithis vermiformibus $\frac{1}{10}$ – $\frac{1}{6}$ mm. longis minute conspersa, nervis lateralibus medio a margine 8 mm. distantibus cum margine subparallelis usque ad acuminem attingentibus et ibi evanescentibus, venis venulisque transverse reticulatis, petiolis $1\frac{1}{2}$ –3 cm. longis teretibus glabris, stipulis intra-axillaribus triangulari-cuspidatis castaneis membranaceis. Flores dioecii. Fl. ♀: spicato-paniculati, paniculis axillaribus 10–13 cm. longis glabris gracilibus erectis ramosis, ramis patentissimis; floribus secus rhachin spicatim glomeratim dispositis, bracteis minutis oblongo-triangularibus glabris.

Perianthium fructiferum 3-partitum, segmentis inæqualibus, segmento posteriore longiore $\frac{4}{5}$ mm. longo lineari dorso carinato intus concavo glabro, segmentis lateralibus ovato-triangularibus minoribus glabris; rudimenta staminum 3 crassa linearia $\frac{1}{2}$ mm. longa Ω -forme recurva. Achænium elongato-oblongum $\frac{2}{3}$ mm. longum biconvexum sublaeve basi apiceque obtusum, stigmate apice ovarii oblique sito, pericarpio crustaceo; testa seminis membranacea; albumen paucum; embryo $\frac{1}{3}$ mm. longus.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

Distinguishable from *P. rotundinucula* by the oblong nutlets.

Pilea rotundinucula HAYATA sp. nov. Rhizoma repens longum teres; caulis ascendens suberectus 30–60 cm. longus glaber (subtetragonus?). Folia opposita in vivo herbaceo-crassiuscula in exsiccato rigido-chartacea lanceolata vel oblanceolata longe petiolata, maxima 21 cm. longa 5 cm. lata apice acuminata basi acuminata ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis angulo acuto a se divaricatis basi usque 5 mm. conjugatis, nervis lateralibus cum margine parallelis a margine 1 cm. distantibus, nervis in exsiccato utraque pagine elevatis, venis venulisque transverse reticulatis, utraque pagine cystolithis vermiformibus minutissimis $\frac{1}{10}$ mm. longis conspersa, petiolis 1–4 mm. longis subteretibus, stipulis intra-axillaribus ovato-triangularibus $1\frac{1}{2}$ mm. longis 1 mm. latis castaneis membranaceis. Flores monœcii vel dicecii: si monœcii floribus fœmineis superioribus quam iis masculinis. Fl. ♂ cymosi, cymis axillaribus cum pedunculis 2–3 cm. longis glabris ramosissimis densiuscule floriferis, bracteis minutis ovato-triangularibus apice acutis vel obtusis, pedicellis ultimis $\frac{1}{5}$ –1 mm. longis glabris. Perianthium 4-lobatum glabrum, lobis glabris tenuibus 2 mm. longis $1\frac{1}{4}$ mm. latis apice dorso brevissime globuloso-apiculatis haud carinatis. Stamina 4, lobis perianthii opposita, filamentis glabris linearibus 2 mm. longis $\frac{1}{2}$ mm. latis, antheris cordiformibus leviter latioribus quam longioribus apice basique 2-lobatis, loculis sursum arcte contactis basi late divaricatis. Rudimentum ovarii setuloso-conicum glabrum minutissimum. Fl. ♀ cymosi, cymis superioribus glabris. Perianthium fructiferum 3-partitum, segmentis 3 inæqualibus glabris, segmento posteriore oblongo-lineari $1\frac{1}{4}$ mm. longo glabro naviculiformi apice interiore recurvo dorso carinato intus concavo, segmentis lateralibus ovato-

triangularibus $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis apice acutis intus concavis dorso sub apice globuloso-cornutis. Rudimenta staminum 3 crassa 1 mm. longa $\frac{1}{3}$ mm. lata Ω -forme recurva. Achænium rotundatum 1 mm. in diametro apice basique oblique obtusum læve biconvexum, stigmate ad apicem ovarii plus minus oblique sito breve pectinato, pericarpio crustaceo. Semina rotundata $\frac{2}{3}$ mm. longa, testa membranacea; embryo ignotus.

HAB. Mt. Arisan, prope Funkiko, Jan. 1912, leg. B. HAYATA.

Pilea Somai HAYATA sp. nov. Herba; caulis 50–60 cm. altus sursum plus minus recurvus supra sulcatus subglaber subsimplex. Folia opposita herbaceo-crassiuscula in exsiccatō rigido-membranacea lineari-lanceolata maxima 11 cm. longa $2\frac{1}{2}$ cm. lata apice acuminata basi subito cuneato-attenuata ad petiolum abeuntia margine subintegra remotissime mucronibus instructa trinervia, nervis lateralibus cum margine parallelis ab ea 2 mm. distantibus sursum prope apicem ad marginem attingentibus vel prope marginem evanescentibus, venis utroque latere costæ numerosis transverse dispositis cum venulis transverse reticulatis, nervis lateralibus basi gradatim convergentibus cum costa ad petiolum abeuntibus, utraque pagina cystolithis vermiformibus $\frac{1}{8}$ – $\frac{1}{10}$ mm. longis regulariter conspersa; nervis supra haud elevatis haud impressis subtus planis; costa centrali 1 mm. lata subtus cystolithis $\frac{1}{10}$ – $\frac{1}{8}$ mm. longis longitudinaliter conspersa; petiolis $1\frac{1}{2}$ –2 cm. longis supra sulcatis, stipulis intra-axillaribus singulis cuspidiformibus castaneis membranaceis $1\frac{1}{2}$ mm. longis 2 mm. latis apice acutis. Flores dioecii. Fl. ♀ cymosi, cymis axillaribus pedunculatis cum pedunculis 4 cm. longis, pedunculis 2 cm. glabris bracteis minutis. Perianthium fructiferum 3-partitum, segmentis inæqualibus, duobus minoribus triangulari-rotundatis 1 mm. longis apiculatis valde concavis margine integris glabris, uno majore $1\frac{1}{3}$ mm. longo dorso carinato. Rudimenta staminum 3 segmentis perianthii opposita glabra 1 mm. longa crassiuscula Ω -forme recurvata. Achænium rotundato-ovatum $1\frac{1}{2}$ mm. longum $1\frac{1}{4}$ mm. latum complanatum biconvexum apice obtusum basi oblique contractum apice infra apicem latere stigmatiferum, stigmate brevissime pectinato, pericarpio crustaceo-coriaceo castaneo minute rubro-punctato. Semina ovata apice acuminata basi truncato-rotundata $1\frac{1}{4}$ mm. longa $\frac{1}{2}$ – $\frac{2}{3}$ mm. lata glabra, testa membranacea; albumen paucum; embryo circ. $\frac{4}{5}$ mm. longus; radicula conica supra $\frac{1}{4}$ mm.

longa; cotyledonibus late rotundatis $\frac{2}{3}$ mm. latis totiusque longis.

HAB. Kuskusu, Jan. 1912, (fructus).

Near *P. smilacifolia* WEDD., (HOOK. f. Fl. Brit. Ind. V. p. 553).

Pilea taitoensis HAYATA sp. nov. Herba subsucculenta 30–60 cm. longa; caulis erectus haud ramosus sursum approximativ foliatus glaber. Folia opposita ovato-lanceolata vel oblongo-ovata interdum valde obliqua rarius æqualia 10–15 cm. longa 4–6 cm. lata apice subito acuminata caudato-acuminata (acuminibus 2 cm. longis ad summum obtusis falcato-recurvis vel rectis) basi rotundata obtusa vel cuneato-obtusa sed ad extremitatem basis semper minute cordata J-formia obliqua vel æqualia margine integra tenuiter cartilagineo-marginata vel grosse undulata 3-nervia, nervis lateralibus cum margine parallelis prope basin acuminis evanescentibus a margine 6 mm–1 cm. distantibus, venulis transverse dispositis grosse reticulatis, pagine supra cystolithis minutis circ. $\frac{1}{8}$ mm. longis vermiformibus (nervis venis venulisque exceptis) conspersa, subtus glabra sed ad nervos cystolithis longitudinaliter dispositis conspersa, petiolis cystolithis longitudinaliter dispositis conspersis $\frac{1}{2}$ – $\frac{1}{4}$ -plo laminam foliorum æquantibus, stipulis axillaribus triangularibus brevioribus. Flores dioecii. Flores ♂ cymosi, cymis paniculiformibus ad axillas foliorum superiorum dispositis cum pedunculis 5–13 cm. longis gracilibus glabris laxè ramosis ad nodos bracteatis, (bracteis minutis late triangularibus $\frac{1}{8}$ mm. longis $\frac{2}{3}$ mm. latis), pedunculis 3–7 cm. longis rectis erectis; flores ad nodos glomeratim dispositi brevissime pedicellati glabri, pedicellis circ. $\frac{2}{3}$ mm. longis glabris apice leviter dilatatis flavis cum flore articulatis. Perianthium glabrum 4-lobatum, tubo obconico $\frac{3}{4}$ mm. longo totiusque lato, lobis oblongo-linearibus $1\frac{1}{3}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusissimis apice rotundatis vel obtusissimis dorso infra apicem plus minus callosis. Stamina 4, ad basin loborum sita, filamentis glabris complanatis linearibus cum lobo æquilongis $\frac{2}{3}$ mm. latis membranaceis multo fusco-rubro-striatis, antheris Ω -formibus, loculis basi divaricatis, dorso infra apicem glandula singula instructis.

HAB. Taito: Haroye, leg. Z. KOBAYASHI, Oct. 1907, (No. 6008), fl. ♂, typus.

Somewhat comparable with an Indian *P. lancifolia* HOOK. f. (Fl. Brit. Ind. V. p. 553), but widely different from it in having quite entire and fleshy

leaves. Also near *P. kankacensis* HAYATA, but distinguishable from it by the much larger oblique leaves and by the much longer and spreading panicles with pedicellate flowers. The cystoliths on the surface of the leaves of *P. taitensis* are much shorter than those of *P. kankacensis*.

Lecanthus WEDD.

Lecanthus Sasakii HAYATA sp. nov. Herba subsucculenta glabra ramosa. Caulis glaber 30–40 cm. longus foliosissimus ramosus basi plus minus repens ad nodos radicans, ramis et ramulis gracilibus tenuibus repentibus ad nodos radicantibus. Folia opposita longe petiolata membranacea oblongo-obovata maxima 11 cm. longa minima 4 cm. longa 22 mm. lata apice caudata (caudis linearibus 8 mm. longis 2–3 mm. latis apice acuminatis) basi cordata rotundata truncata vel triangulari-acuta margine prope basin et in cauda integra cæterum argute serrata, (serris mediis ascendentibus rotundatis triangularibus 3 mm. latis 2 mm. longis ab apice usque ad apicem 4 mm. distantibus apice breve cuspidatis sed haud aristatis) margine tota sub lente minute brevissime ciliolata trinervia, nervis lateralibus extrorsum venuliferis, venulis arcuatis ad apicem serrarum attingentibus, pilis rigidis calcareis $\frac{4}{5}$ mm. longis $2\frac{4}{5}$ mm. latis 3-cellularibus liberis prope marginem ad paginam superiorem sparsissime dispositis, pagina supra pilis $\frac{1}{5}$ mm. longis densiuscule conspersa, subtus nervis venis exceptis glabra, nervis et venis pilis liberis conspersis, petiolis laminam foliorum in longitudine $\frac{1}{5}$ -plo æquantibus intus sursum plus minus sulcatis glabris, stipulis scariosis tenuissimis membranaceis subhyalinis axillaribus triangulari-ovatis 4 mm. longis $2\frac{1}{2}$ mm. latis apice obtusis basi caulem semi-amplectantibus intus glabris margine ciliatis extus pilis liberis conspersis. Flores ♀ capiculati, capitulis solitariter axillaribus subpeltiformibus 1– $\frac{1}{2}$ cm. in diametro pedunculatis (pedunculis circ. 1 cm. longis glabris) bracteis 1–2-seriatim dispositis involucreatis; involucri bractee late triangulares glabrae apice acutae versus apicem rubro-punctatae; bracteolae vel paleae ad receptaculum minutae lanceolatae vel lineares 1 mm. longae $\frac{1}{5}$ mm. latae glabrae acuminatissimae; flores sessiles vel pedicellati, (pedicellis 1–2 mm. longis crassis glabris). Perianthii fructiferi segmenta 4 linearia $1\frac{1}{2}$ mm. longa $\frac{1}{2}$ mm. lata apice obtusa basi haud contracta utraque glabra dorso infra apicem brevissime cornuta, cornibus callosiformibus obtusissimis. Staminodia in flore fructifero 3 hyalina

crassissima linearia $1\frac{1}{2}$ mm. longa $\frac{1}{2}$ mm. lata cum segmentis opposita apice triangulari obtusa Ω -formiter recurvata glaberrima. Achænium fusco-rubescens ovoideum vel ellipsoideum 1 mm. longum $\frac{1}{2}$ – $\frac{2}{3}$ mm. latum glabrum læve vel minuto obscureque muricatum utrinque obtusum apice stigmate minuto coronatum basi stipite $\frac{1}{10}$ mm. longo stipitatum. Seminis testa fusco-rubescens membranacea elegante minuteque tuberculato-punctata; albumen paucum; embryo amplus ovoideus plus minus complanatus; radícula obconica cotyledones in longitudine $\frac{3}{4}$ -plo æquans apice obtusa basi ad cotyledones abeuns haud contracta. *Lecanthus Wightii* HAYATA Fl. Mont. Formos. p. 197, (non WEDD.).

HAB. in monte Arisan, Jan. 1912, leg. B. HAYATA et S. SASAKI.

Near *Lecanthus Wightii* WEDD., but distinguishable from it by the shortly tailed leaves.

***Pellionia* GAUDICH.**

Pellionia arisanensis HAYATA sp. nov. (Fig. 6.) Caulis basi procumbens ad nodos radicans tetragonus sursum ascendens densissime brevissime hirsutus sursum foliatus. Folia alterna oblique ovato-oblonga vel oblonga circ. 3 cm. longa 1 cm. lata apice caudato-acuminata ad summum obtuso-acuta basi valde obliqua latere superiore obtusa fracta latere inferiore minute cordata vel rotundata vel subauriculata margine basi apice exceptis acute serrata, serris ascendentibus acutis utroque latere 4–5 a se remotis, pagine utraque subglabra; petiolis 3 mm. longis, stipulis singulis extra-axillaribus setiformibus latere superiore caulis sitis. Flores monœcii vel diœcii; flores masculini cymosi, cymis ad folia superiora solitariter axillaribus cum pedunculis $1\frac{1}{2}$ –2 cm. longis 1–2 cm. latis (pedunculis circ. 1 cm. longis basi bracteis minutis 2–3 instructis apice dense floriferis) sub lente minute hirsutis versus apicem ramosissimis, ramis hirsutis, pedicellis ultimis glabris 1– $1\frac{1}{2}$ mm. longis basi bracteis singulis instructis, bracteis lineari-lanceolatis 3 mm. longis $\frac{3}{4}$ mm. latis apice acutis utraque pagine glabris basi haud contractis dorso infra apicem cornu singulo instructis, cornibus latere complanatis $\frac{1}{3}$ mm. longis triangularibus dorso plus minus carinatis; pedicellis persistentibus apice cum flore caducissimo articulatis. Alabastrum floris subglobosum versus apicem 5-cornutum glabrum. Fl. ♂: perianthium floris apertientis 5-fidum 4 mm. in diametro pallidum extus viridescens intus album, tubo brevi 1 mm. in diametro, lobis patentissimis

5, 3 interioribus latioribus oblongis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ vel $1\frac{2}{3}$ mm. latis apice obtusissimis vel truncatis vel acutis basi haud contractis margine erosio concavis dorso medio tenuiter carinatis infra apicem supra medium dorso 1-cornutis, cornibus 1 mm. longis latere complanatis deorsum recurvis unciformibus, lobis 2 exterioribus angustioribus spathulato-linearibus 2 mm. longis 1 mm. latis apice truncatis vel obtusissimis vel acutis infra apicem 1-cornutis. Stamina 5 lobis perianthii opposita, filamentis basi loborum affixis liberis glabris et iis æquilongis, antheris

∞-formibus albis, loculis oblongo-linearibus 1 mm. longis apice se contactis basi in angulo 30° — 45° divaricatis. Rudimentum ovarii nullum. Flores fœminei densissime cymosi; cymæ subcapituliformes patelliformes bracteis linearibus oblongis 1–2 mm. longis $\frac{1}{3}$ –1 mm. latis multis involucratæ circ. 5 mm. in diametro ∞-floratæ subsessiles vel brevissime pedunculatæ (pedunculis 1 mm. longis brevissime hirsutis); cymis ramosissimis, ramis brevissimis, pedicellis ultimis $\frac{1}{2}$ mm. longis vel nullis glabris. Perianthium 4–5-fidum, segmentis 2-exterioribus minoribus 3-interioribus majoribus totis erectis apertientibus, exterioribus linearibus $\frac{1}{2}$ mm. longis $\frac{1}{3}$ mm. latis apice acutis vel obtusis concavis erectis rectis glabris dorso haud carinatis, interioribus 2–3 plus minus longioribus linearibus apice acutis vel obtusis valde concavis dorso infra apicem longissime cornutis, cornibus circ. 1 mm. longis teretibus viridibus. Rudimenta staminum 5 minutissima pulviniformia. Ovarium ellipsoideum $\frac{1}{3}$ mm. longum glabrum utrinque obtusum, stigmate sessili pectinato-penicillato. Fructus ignotus.

HAB. Mt. Arisan, leg. B. HAYATA, inter Heishana et Nimandaira, Mart. 1914.

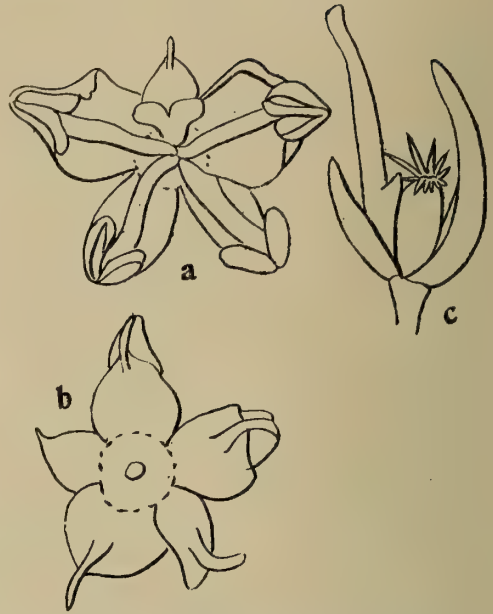


Fig. 6, *Pellionia arisanensis* HAYATA; a, a male flower; b, the same, seen from back; c, a female flower.

Near *Pellionia radicans* WEDD.; but distinguishable from it in the much narrower leaves.

Pellionia okinawensis HAYATA sp. nov. Herba basi procumbens ad nodos radicans, radicibus fibrosis filiformibus, sursum ascendens. Caulis circ. 20 cm. longus haud ramosus vel rarius pauci-ramosus dense brevissimeque hirsutus (pilis retrorse recurvis brevissimis $\frac{1}{2}$ – $\frac{2}{5}$ mm. longis) sursum foliatus. Folia alterna brevissime petiolata dorsiventraliter disposita ovata vel oblongo-ovata $2\frac{1}{2}$ – $3\frac{1}{2}$ cm. longa 13–16 mm. lata apice recto-elongato-triangularia ad summum obtusissima basi valde obliqua latere inferiore valde rotundata vel anguste cordata auriculiformia latere superiore recto-cuneata ad extremitatem basis obtusa margine haud ciliolata grosse serrata, (serris subereniformibus ascendentibus obscure aristatis a sinibus mediis ad sinus proximos 6 mm. longis), haud trinervia, venis primariis lateralibus utroque latere costæ 3–4 basi rectis medio subito arcuatis cum iis superioribus junctis, venulis prope apicem serrarum evanescentibus haud attingentibus, costis venis venulisque supra haud elevatis haud impressis subtus leviter elevatis, pagina supra subglabra, subtus venis venulis sparse hirsutis exceptis glabra, petiolis 2–3 mm. longis minutissime hirsutis, stipulis extra-axillaribus singulis linearibus $1\frac{1}{2}$ mm. longis acuminatis crassiusculis facie dorsali caulis sitis. Flores dense cymose dispositi; cymæ densissime floriferæ subcapituliformes sed haud involucreatæ in ambitu rotundatæ 5–6 mm. in diametro solitariae pedunculatæ, (pedunculis 5 mm.–10 mm. longis dense brevissime pilosis, pilis $\frac{1}{2}$ – $\frac{1}{5}$ mm. longis descendento-patentibus); floribus pedicellatis, pedicellis $\frac{1}{2}$ mm. longis glabris basi bracteatis et bracteolatis, bracteis linearibus 3 mm. longis acutis intus glabris extus paucissime hirsutis, bracteolis angustissimis. Perianthii fructiferi segmenta 5, angustissime linearia erecta, 2–exterioribus minoribus, 3–interioribus majoribus; exterioribus 1 – $1\frac{1}{3}$ mm. longis apice acuminatis $\frac{1}{5}$ mm. latis glabris dorso haud cornutis margine minute remoteque glanduloso-ciliolatis; interioribus dorso infra apicem longe cornutis, cornibus teretibus linearibus 1 mm. longis $\frac{1}{10}$ mm. latis. Rudimenta staminum 5 minuta inconspicua linearia $\frac{1}{3}$ mm. longa Λ -forme recurva. Achæmium ellipsoideum $1\frac{1}{3}$ mm. longum $\frac{3}{4}$ mm. latum apice obtusissimum basi subito acutum brevissime stipitatum prominente botrioideo-tuberculatum, (tuberculis apice rubro-maculatis $\frac{2}{5}$ mm. longis totius-

que latis latere complanatis); testa seminis membranacea fusco-rubescens; albumen paucum; embryo amplius dorso complanatus; radicuula obconica ad cotyledones abeuns.

HAB. Okinawa, leg. Y. TASHIRO, Mart. 1889.

Near *P. arisanensis* HAYATA, but distinguishable from it by the not caudate leaves, and by the pedunculate female inflorescence.

Pellionia trilobulata HAYATA Mater. Fl. Formos. p. 280. Descriptio aucta:—Flores dicecii. Fl. ♂: dense cymosi; cymæ subcapiculiformes bracteis involucretae pedunculatae axillares solitariae, pedunculis 6 mm. longis glabris erectis; bracteis inferioribus oppositis ovatis 3 mm. longis apice obtusis intus glabris extus hirsutis dorso carinatis (carinis sub apice ad cornuem productis, cornibus $\frac{1}{3}$ mm. longis obtusis) basi cum iis oppositis connatis margine ciliatis. Flores apertientes pedicillati, pedicellis $1\frac{1}{2}$ mm. longis apice cum flore articulatis. Perianthium: tubo breve obconico $\frac{1}{2}$ mm. longo $1\frac{1}{2}$ mm. in diametro, limbo 4-partito, partibus 2 exterioribus leviter minoribus oblongis 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi contractis margine integris valde concavis dorso carinatis sub apice cornutis, cornibus circ. 1 mm. longis erectis vel interiore uncinato-recurvis, extus sparse hirsutis, partibus 2 interioribus leviter majoribus cum exterioribus conformibus sed margine sub microscopio minute erosis dorso carinatis cornutis. Stamina 4 segmentis perianthii opposita, filamentis basi segmentorum oriundis ad 1 mm. cum segmentis connatis cæterum liberis linearibus vittæformibus 2 mm. longis $\frac{1}{2}$ mm. latis valde complanatis glabris, antheris 2-locularibus, loculis linearibus 1 mm. longis $\frac{1}{4}$ mm. latis apice contactis cæterum separatis divergentibus interiore alatis. Rudimentum ovarii nullum.

HAB. inter Heishana et Nimandaira, leg. B. HAYATA, April. 1914, (fl. ♂).

Pellionia Tashiroi HAYATA sp. nov. Herba humilis basi procumbens ad nodos radicefera sursum ascendens, partibus ascendentibus 6–7 cm. longis. Caulis pauci-ramosus densissime brevissimeque hirsutus sursum foliatus. Folia alterna ovato-oblonga vel oblonga $1\frac{1}{2}$ cm. longa 1 cm. lata apice obtusa basi valde obliqua latere superiore obtusa plus minus fracta latere inferiore minute cordata vel rotundata, in latere inferiore latiora quam in latere superiore, pagina

supra subglabra pilis calcareis circ. $\frac{2}{3}$ mm. longis sparsissime conspersa subtus venis nervis sparse hirsutis exceptis glabra margine crenato-serrata, serris ascendentibus utroque latere 4-5 obtusissimis haud ciliatis, petiolis 1-2 mm. longis, stipulis singulis extra-axillaribus linearibus 1 mm. longis setiformibus glabris latere superiore caulis sitis. Flores dioecii. Flores feminei ad axillas dense fasciculati, fasciculis capituliformibus subsessilibus vel brevissime pedunculatis (pedunculis $\frac{1}{4}$ mm. longis) 2 mm. in diametro bracteis multis involucreatis; bracteis lanceolatis 1 mm. longis $\frac{1}{2}$ mm. latis acuminatis intus glabris basi plus minus contractis extus glabris patentibus; bracteis inter flores cum iis involucri æquiformibus; bracteolis floris minoribus; flores brevissime pedicellati vel sessiles. Segmenta perianthii 5, 3-majoribus, 2-minoribus; minoribus $\frac{1}{2}$ mm. longis linearibus haud cornutis; majoribus dorso infra apicem cornutis cum cornibus $\frac{2}{3}$ mm. longis. Ovarium minutissimum, stigmate terminali pectinato-penicillato.

HAB. Loochoo, leg. Y. TASHIRO, Mart. 1887.

Remarkable for the smaller heads of the female flowers.

Elatostema FORST.

Elatostema herbaceifolia HAYATA sp. nov. Herba tenuis gracilis 50-60 cm. longa. Caulis gracillimus scandens glaber sursum remote foliatus. Folia alterna remote disposita tenuiter membranacea obovato-lanceolata vel ovato-lanceolata maxima 14 cm. longa 4 cm. lata apice caudato-acuminata, (acuminibus linearibus $3\frac{1}{2}$ cm. longis medio 4 mm. latis integris) basi obliqua obtusa latere superiore recto-angusto-cuneata, latere inferiore rotundata vel obtusa, latere superiore medio 16 mm. lato, latere inferiore medio 24 mm. lato, margine basi acumineque excepto grosse serrata (serris late triangulari-acutis apice subobtusis breve cuspidiformibus 9 mm. latis $2\frac{1}{2}$ mm. longis ascendentibus) venis nervisque tenuissimis, pagine supra pilis liberis $\frac{2}{3}$ mm. longis sparsissime cystolithis $\frac{1}{6}$ mm. longis vermiformibus toto regulariter conspersa, pagina subtus haud lepidota sed cystolithis vermiformibus conspersa, pilis liberis nullis, petiolis brevissimis 2 mm. longis, stipulis caducissimis lanceolatis membranaceis 4 mm. longis acutis gemmam involventibus demum deciduis. Flores dioecii. Fl. ♀: dense capitulati, capitulis axillaribus solitariis peltiformibus densissime brevissime villosis pedunculatis, pedunculis 2 mm. longis, receptaculis

capituli peltiformibus rotundatis 7–8 mm. in diametro supra leviter convexis subtus leviter concavis margine bracteis exterioribus 5 majoribus linearibus 2 mm. longis et interioribus linearibus minoribus $\frac{1}{2}$ mm. longis multis involucretis; palcæ inter flores densissime dispositæ linearis-spathulatæ $\frac{1}{2}$ – $\frac{1}{3}$ mm. longæ $\frac{1}{8}$ – $\frac{1}{5}$ mm. latæ apice truncatæ et dense piloso-setulosæ; flores brevissime pedicellati, pedicellis $\frac{1}{10}$ mm. longis glabris; perianthium fl. ♀ minutum $\frac{1}{20}$ mm. longum $\frac{1}{10}$ mm. latum 3–4-lobatum, lobis linearibus. Ovarium ovoideum $\frac{1}{6}$ mm. longum, stigmate sessile pectinato.

HAB. Formosa, loco non indicato: Description above given is drawn from premature flowers. It is desirable to repeat the description when perfect materials are collected. Near *Elatostema lineolatum* WIGHT, but distinguishable from it in having much thinner leaves and quite glabrous branches.

Elatostema lineolatum WIGHT var. **major** THW.; MATSUM. et HAYATA Enum. Pl. Formos. p. 384. Herbaceo-suffrutescens 60 cm. altus, ramis et ramulis teretibus fuscentibus densissime brevissime hirsutis (pilis transverse patentibus vel descendentibus) sursum foliatis. Folia alterna obovato-lanceolata vel oblanceolata membranacea sessilia vel brevissime petiolata 6–10 cm. longa 2–3 cm. lata apice caudato-acuminata (acuminibus 1–2½ cm. longis basi 4 mm. latis ad summum aristato-acuminatis) basi plus minus obliqua recto-cuneato-acuminata ad extremitatem obtusa margine medio deorsum integra medio sursum grosse serrata, (serris latere superiore 2–3 latere inferiore 5, triangulari-acutis apice breve cuspidatis), venis lateralibus primariis utroque latere costæ 4–5 a costa angulo acuto egressis, costis venisque supra planis subtus elevatis, pagine supra pilis liberis $\frac{2}{3}$ mm. longis et cystolithis brevissimis $\frac{1}{6}$ mm. longis vermiformibus conspersa, pagina subtus ad venas nervosque pilis liberis hirsuta, petiolis brevissimis 2 mm. longis adpresse hirsutis vel subnullis, stipulis linearibus 7 mm. longis singulis 1 mm. latis apice acuminatis aristatis hirsutis castaneis membranaceis extra-axillaribus latere superiore caulis sitis. Flores dioecii. Fl. ♀: ad axillas foliorum fasciculati; fasciculi solitarii basi bracteis castaneis 3–4 lanceolatis 1–2 mm. longis medio carinatis acuminatis margine ciliatis instructi capituliformes peltiformes 6 mm. in diametro bracteis 4–5 exterioribus majoribus involucreti, bracteis involucrealibus majoribus plus minus connatis late ovatis 2 mm. latis totiusque longis apice obtusis vel acutis

dorso extus dense hirsutis intus glaberrimis, interioribus minoribus; bracteæ inter flores (vel paleæ) in forma variabilissimæ lineares obovatæ vel oblongæ vel spathulatæ intus glabræ extus apice dense pilosæ circ. 2 mm. longæ; pedicellis 2 mm. longis apice cum flore articulatis glabris. Perianthium 4-lobatum, tubo brevissimo, lobis lineari-oblongis $1\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice obtusis extus dorso sub apicem breve cornutis basi haud contractis intus glabris extus versus apicem longe pilosis. Stamina 4 cum lobis perianthii opposita, filamentis a basi loborum liberis 2 mm. longis. Rudimentum ovarii glabrum minutum vel subnullum.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912.

Elatostema microcephalantha HAYATA sp. nov. Herba. Caulis basi repens radicans sursum ascendens 10–20 cm. longus breve hirsutus (pilis adpresso-ascendentibus circ. $\frac{1}{3}$ mm. longis), sursum foliatus, partibus caulis foliiferis plus minus flexuosis. Folia alterna herbaceo-membranacea a se $\frac{1}{2}$ –1 cm. remota ovata valde obliqua 2 cm. longa 13–14 mm. lata apice obtusa basi valde obliqua latere superiore cuneato-obtusa in latere inferiore rotundata vel rotundato-cordata medio latere superiore 5 mm. lata in latere inferiore 8 mm. lata margine partibus basilaribus exceptis grosse serrata, serris ascendentibus apice rotundatis vel obtusissimis mediis a se (ab sinu ad sinus) 5 mm. distantibus basi 5 mm. latis 3 mm. longis, subtrinervia vel obscure trinervia, nervis cum venis grossissime reticulatis, nervis venisque supra valde impressis subtus elevatis, venis ad apicem serrarum attingentibus, pagina supra marginibus exceptis glabra, margine ciliolata, pagina subtus sparsissime hirsuta, petiolis brevissimis 1 mm. longis hirsutis supra sulcatis, stipulis dimorphis, alteris extra-petiole linearibus apice acutis $1\frac{1}{3}$ mm. longis $\frac{1}{3}$ mm. latis crassiusculis extus hirsutis intus glabris, alteris intra-petiole triangulari-oblongis $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis acutis membranaceis subglabris. Flores ♀ capitulati, capitulis solitariis axillaribus peltiformibus 3–4 mm. in diametro pedunculatis, pedunculis 2–3 mm. longis glabris. Involucrum subpeltiforme margine bracteis circ. 3–seriatim dispositis involucreto, bracteis exterioribus 5 latioribus oblongo-triangularibus acutis vel obtusis 1 mm. longis margine setulosis utraque pagine glabris, interioribus gradatim angustioribus, intimis linearibus apice margineque setulosis, bracteolis vel paleis inter flores sitis spathulatis circ. 1 mm. longis $\frac{1}{3}$ mm. latis

apice obtusis margine apiceque setulosis intus glabris extus dorso versus apicem plus minus setulosis deorsum glabris interdum valde angustatis lineari-filiformibus. Capitula unisexualia; receptaculum subplanum glabrum; flores pedicellati, pedicellis glabris $\frac{1}{2}$ mm. longis $\frac{1}{4}$ mm. crassis crassiusculis. Fl. ♀ minutissimi $\frac{1}{3}$ mm. in diametro: segmenta 3 triangularia vel linearia circ. $\frac{1}{8}$ mm. longa versus apicem rubro-punctata; staminodia 3 segmentis perianthii opposita $\frac{1}{2}$ – $\frac{1}{3}$ mm. longa $\frac{1}{4}$ – $\frac{1}{5}$ mm. lata linearia vermiformia Ω -formæ recurva infra achænium insita. Achænium ovoideo-ellipsoideum $\frac{3}{5}$ mm. longum $\frac{2}{5}$ mm. latum apice obtusum ad summum stigmatē penicillato minuto coronatum basi acutum stipite minute $\frac{1}{5}$ mm. longo obconico stipitatum, sublævæ vel minute tuberculatum haud echinatum haud muricatum. Semina ovoideo-ellipsoidea; testa membranacea; albumen nullum; embryo amplius haud vel vix complanatus elliptico-obovoideus; radícula supra coniformi basi gradatim ad cotyledones abeuns cotyledones in longitudine $\frac{3}{4}$ -plo æquans; cotyledones crassæ oblongæ.

HAB. Mt. Arisan, leg. B. HAYATA, Jan. 1912. From the position of the seed and embryo, it is justly considered that the ovules are erect and orthotropous. Near *Elatostema sessile*, but differs from it by the smaller leaves.

Elatostema minutum HAYATA (Fig. 7) Fl. Mont. Formos. p. 198 t. 36. Descriptio aucta:—Fl. ♂: cymosi, cymis axillaribus solitariis glabris capituliformibus breve pedunculatis, pedunculis 1 mm. longis basi minute bracteatis; cymis 6-floratis rarius 10-floratis bracteis et bracteolis involucreatis, bracteis ordinis I. late rotundatis 2 mm. longis totiusque latis apice rotundatis infra apicem dorso brevissime cornuto-apiculatis margine minute ciliolatis utraque pagine glabris valde concavis; bracteis ordinis II. oblongo-naviculiformibus 2 mm. longis explicato totiusque latis apice 2-lobatis vel rotundatis dorso apice hirsutis margine apice ciliolatis deorsum haud ciliolatis intus glaberrimis, bracteis ordinis III. (vel bracteolis) obovato-cuneatis 2 mm. longis 1 mm. latis apice rotundatis latissimis leviter 2-lobatis apice margine ciliolatis cæterum haud ciliolatis; pedicellis florum $1\frac{1}{2}$ mm. longis glabris haud bracteatis. Perianthii lobi 5, lobis obovato-

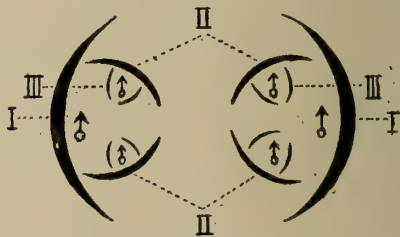


Fig. 7, *Elatostema minutum* HAYATA; a diagram of a male inflorescence.

linearibus 1 mm. longis $\frac{2}{3}$ mm. latis apice rotundatis ciliatis vel haud ciliatis intus concavis vel haud concavis dorso infra apicem cornutis vel haud cornutis. Stamina 5 cum lobis perianthii opposita, filamentis linearibus $1\frac{1}{2}$ mm. longis dorso complanatis, antheris ovato-oblongis $\frac{1}{2}$ mm. longis. Rudimentum ovarii 0.

HAB. Arisan, 2500 m. alt., Juni. 1914, U. FAURIE, (No. 612).

Chamabaina WIGHT.

Chamabaina Morii HAYATA Mater. Fl. Formos. p. 282. Descriptio aucta: Flores dioecii. Fl. ♀: ad nodos ad axillas stipularum fasciculati brevissime pedicellati, pedicellis $\frac{1}{5}$ mm. longis basi bracteatis, bracteis ovato-oblongis $\frac{4}{5}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis intus glabris extus hirsutis castaneis apice setulis 2-3 instructis membranaceis, bracteolis lanceolatis $\frac{2}{3}$ mm. longis extus hirsutis. Perianthium obovoideo-urceolatum $\frac{2}{3}$ mm. longum $\frac{1}{2}$ mm. latum apice valde contractum brevissime rostratum ore 2-3-lobatum vel elobatum extus setuloso-hirsutum intus glabrum basi obtusum. Staminodia toto obsoleta. Ovarium ellipsoideum cum rostris $\frac{4}{5}$ mm. longum $\frac{1}{2}$ mm. latum, rostro (vel stylo) $\frac{1}{6}$ mm. longo apice peltatim dilatato, pelta (vel stigmate) margine longe fimbriata. Achæmium maturum perianthio complete obtectum oblongum biconvexum $\frac{4}{5}$ mm. longum $\frac{1}{2}$ mm. latum rubescens nitidum apice latere uno prominente latere uno minus carinatum apice breve stylo brevissimo apiculatum basi obtusum, pericarpio crustaceo. Seminis testa membranacea; albumen paucum; embryo $\frac{2}{3}$ mm. longus; radicula oblongo-conica; cotyledonibus oblongis.

HAB. Mt. Hanpōfukuzan, leg. T. SŌMA, Dec. 1914, fr.

Juglandaceæ.

Engelhardtia LESCH.

Engelhardtia formosana HAYATA n. n. *Engelhardtia spicata* BLUME var. *formosana* HAYATA Fl. Mont. Formos. p. 199. Descriptio aucta: Flores monoecii. Fl. ♂: spicato-paniculati, paniculis terminalibus pauci-ramosis, ramis simplicibus circ. 10 cm. longis gracillimis recurvo-cornutis spicatim florigeris, rhachibus dense lepidotis, lepidibus rotundatis $\frac{2}{5}$ mm. in diametro medio rotundato-elevatis margine integris, pedicellis subnullis, bracteis nullis, floribus a se 2-3 mm. remotis. Perianthium 3-4-partitum, partibus apice margineque

valde concavo-recurvis sacciforme globosis $1\frac{1}{2}$ mm. in diametro extus dense lepidotis intus glabris. Stamina 8-10, antheris sessilibus oblongo-globosis $\frac{1}{2}$ mm. longis $\frac{1}{3}$ mm. latis utrinque emarginatis glabris. Rudimentum ovarii nullum. Fl. ♀: paniculæ rami graciles basi ascendentes sursum subcernui bracteis nullis; flores pedicellati, pedicellis 2 mm. longis dense lepidotis transverse insitis, floribus ascendento-erectis; bractea 3-fida crassiuscula extus dense lepidota margine et intus densissime tomentosa, segmento anteriore longissimo lineari $1\frac{1}{2}$ -2 mm. longo $\frac{1}{2}$ mm. lato, segmentis lateralibus brevioribus 1 mm. longis $\frac{2}{3}$ mm. latis obtusis, totis intus densissime stellatis. Ovarium inferum $1\frac{1}{3}$ mm. longum 1 mm. latum densissime lepidotum apice basique plus minus constrictum cum tubo perianthii connatum, lobis perianthii 4 linearibus crassiusculis $1\frac{1}{2}$ mm. longis $\frac{1}{2}$ mm. latis apice obtusis margine apiceque valde interiore recurvis sacciformibus extus sparse lepidotis. Styli brevissimi $\frac{1}{4}$ mm. longi 2-fidi, ramis divaricatis apice 2-lobis, lobis uncinato-recurvis stigmatosis; ovarium 2-loculare.

HAB. Uraisha, leg. S. SASAKI, Aug. 1910; ibidem, leg. B. HAYATA, Juli. 1912, fl. ♀ et ♂.

Cupuliferæ.

Carpinus LINN.

Carpinus hogcensis HAYATA sp. nov. Arborescens; ramulis fusco-purpurascensibus lævibus gracillimis, lenticellis minutis sparsissimis vel nullis. Folia membranacea vel membranaceo-chartacea alterna ovato-lanceolata 8 cm. longa 27 mm. lata apice triangulari-acuminata vel gradatim acuminatissima basi leviter cordata supra basin latissima margine simpliciter vel duplicatim serrulata, serrulis ascendentibus late triangularibus latere interiore serrulis secundariis unis instructis apice rectis vel interiore recurvis, utraque pagine hirsuta sed ad costas et venas sparse hirsuta subtus ad axillas inter costam et venas pilis dense fasciculatis instructa, costis et venis supra haud vel vix elevatis, subtus distincte manifesteque elevatis, venis primariis lateralibus utroque latere costæ 15-17 rectis mediis a costa angulo 45° egressis usque ad apicem rectis prope apicem subito arcuatis ascendentibus ad apicem serrularum attingentibus, petiolis 17 mm. longis teretibus glabris vel sparse hirsutis haud sulcatis.

Spicæ fructiferæ terminales cum pedunculis 5–10 cm. longis nutantes, pedunculis 2–3 cm. longis, fructibus oppositis, jugis 1 cm. remotis, bracteis cultriformibus vel semi-ovatis 10–13 mm. longis 4–5 mm. latis apice acutis obtusis basi obtusissimis vel rotundatis basin achæniî haud vel vix amplexantibus extus deorsum hirsutis intus subglabris margine latere interiore rectis integris, latere exteriori serratis curvis, latere interiore angustiore latere exteriori latiore costis et venis utraque pagine elevatis reticulatis, reticulis utraque pagine elevatis. Achæniû leviter complanatum ovato-rotundatum 3 mm. longum totiusque latum apice obtusissimum basi truncato-rotundatum minute pubescens sursum versus apicem barbatum reliquis stylosum apice coronatum facie circ. 10-costatum.

HAB. Musha : Hōgō, ad 3500 ped. alt., leg.

B. HAYATA, Aprili. 1916.

Near *C. Kawakamii* HAYATA, but separable from it by the elongate ovate-oblong leaves which are always cordate at the base.

Carpinus rankanensis HAYATA sp. nov.
(Pl. X. et fig. 8.) Arbor. Ramuli fuscentes minute lenticellati, lenticellis fulvescentibus leviter elevatis verticaliter elongatis vel linearibus, ramulis ultimis lævibus fulvescentibus glabris. Folia decidua alterna viridia membranaceo-chartacea ovato-oblonga 8–10 cm. longa 3–4 cm. lata apice subito acuminata vel caudata basi profunde cordata margine irregulariter serrulata, serrulis ascendentibus ad apicem aristis superiore recurvis instructis, costis venisque supra impressis subtus elevatis supra ad costam hirsuta cæterum glabra, subtus ad costam venasque pilosa, pilis adpressis rectis mollis cæterum glabra, venis lateralibus parallelis utroque latere costæ 20–25 a se 3–4 mm. distantibus rectis ad marginem attingentibus, petiolis 5–10 mm. longis glabris.

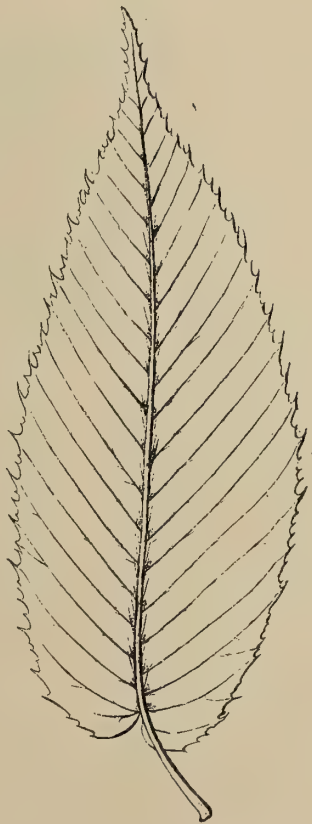


Fig. 8, *Carpinus rankanensis*
HAYATA.

Amenta fructifera terminalia pendula cylindrico-linearia 10–12 cm. longa 2 cm. lata, pedunculis 2–3 cm. longis gracilibus deorsum recurvis hirsutis sursum bracteis 4–5 instructis; amenta longe cylindrica 10–12 cm. longa 18 mm. lata, bracteis fructiferis dense imbricatis plus minus oblique ovatis 13 mm. longis 7 mm. latis basi auriculato-plicatis achænium firme amplexantibus basi dense barbatis utraque pagine elevato-reticulatis utraque pagine hirsutis margine pauciserratis. Achænium prematurum 10-costatum glabrum apice barbatum stigmatibus linearibus 2 coronatum.

HAB. Rankanzan, ad 4000 ped. alt., leg. B. HAYATA, Mai. 1916.

Near *Carpinus japonica*, but differs from it in the much longer and narrower fruiting catkins.

Quercus LINN.

Quercus longicaudata HAYATA Ic. Pl. Formos. III. p. 182. Descriptio aucta: Fructus cum cupulis conico-pyramidalis 1 cm. longus 9 mm. latus apice conico-acutus basi subtruncatus stipitatus, stipitibus 3 mm. longis. Glans coniformis subtriangularis in sectione apice acuta basi truncata tenuiter hirsuta vel glabra castanea cupula complete inclusa, cupula coriaceo-crustacea sparse muricata.

HAB. Daibu, leg. S. NAKAI, Dec. 1912. (Fr.)

Quercus Sasaki KANEHIRA sp. nov. Arbor; ramuli teretes fusco-purpurascens minute laxiusculeque lenticellati haud rugosi, lenticellis rotundatis elevatis. Folia coriacea oblongo-oblongata vel obovato-oblonga vel oblonga 7–11 cm. longa $2\frac{1}{2}$ – $3\frac{1}{2}$ cm. lata apice acuminata vel cuspidato-acuminata basi truncata acuta vel obtusa margine a basi ad medium integra a medio sursum grosse serrata, serris ascendentibus apice plus minus interiore recurvis, supra nitida subtus glauca, costis venisque supra haud elevatis subtus elevatis, venis primariis lateralibus utroque latere costæ 9–11, mediis a costa angulo 40° – 45° egressis rectis ad apicem serrarum attingentibus, petiolis 18–22 mm. longis semiteretibus glabris. Cupula depresso-semi-globosa 10–12 mm. alta 14 mm. in diametro extus fusco-glauca annulis notata, annulis circ. 10, intus fulvo-sericea. Glans semi-globosa valde depressa 8–9 mm. alta 16 mm. in diametro ad summum impressa ad centrum breve apiculata basi subplana, cicatricibus elevatis 9 mm. in diametro.

HAB. Kappanzan, leg. S. SASAKI, Nov. 1915. (Fr.)

Near *Q. glauca* TH. in the leaves, but distinguishable from it by the glandes which are very much depressed at the top.

Salicineæ.

Salix LINN.

Salix eriostroma HAYATA sp. nov. Frutex. Rami recti, cortice lævi fulvescenti, brevissime hirsuti, ramulis foliiferis rectis gracilibus dense villosis. Folia chartacea oblongo-lanceolata 3–4 cm. longa 9–10 mm. lata margine integra utrinque acuta supra sparse subtus densissime sericeo-villosa, venis lateralibus primariis utroque latere costæ circ. 10 sursum arcuatis tenuissimis, petiolis 3 mm. longis villosis, stipulis minutissimis lanceolato-triangularibus $\frac{1}{2}$ mm. longis. Amenta fructifera ad ramos annotinos lateraliter sita 6 cm. longa 8 mm. lata sessilia densissime fructifera, pedicellis pilosis 1 mm. longis, bracteis ellipticis 1 mm. longis extus pilosis apice truncatis intus glabris, fructibus 4 mm. longis glabris rubescentibus ad basin minute tenuiter hirsutis, rhachibus amenti dense pilosis.

HAB. Tonkurankei, leg. U. MORI, 1910, Aprili, (fr.)

Near *Salix transarisanensis* HAY., but distinguishable from it by the very much more villose bracts and by the leaves which are sericeously villose on the under surface.

Salix suishænsis HAYATA sp. nov. Frutex 2–3 m. altus ramosus, ramulis gracilibus lævibus sparsissime hirsutis. Folia chartacea oblonga obovata vel obovato-oblonga 8–9 cm. longa $3\frac{1}{2}$ cm. lata apice cuspidato-acuminata vel acuminata basi obtuse cordata vel minute cordata margine minute serrulata basi glandulis 2 instructa supra subglabra subtus fulvo-hirsuta utraque distincte venosa, petiolis 12 mm. longis. Amentum florum ♂: lineari-cylindricum cernuum 6 cm. longum dense hirsutum dense floriferum, bracteis obovatis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice rotundato-obtusis basi angustioribus utraque pagine hirsutis membranaceis, discis obtusis $\frac{1}{2}$ mm. longis; staminibus 6, filamentis basi hirsutis sursum glabris, antheris reniforme-rotundatis 2-locularibus.

HAB. Suisha, secus stagnum, Aprili. 1916, leg. B. HAYATA.

Near *S. Warburgii* SEEM., but separable from it by the leaves which are hirsute beneath.

Coniferæ.

Podocarpus L' HÉR.

Podocarpus Nakaii HAYATA sp. nov. Arbor. Ramuli teretes fusci glabri. Folia ad nodos approximatum et versus internodia remote alternatimque disposita lineari-lanceolata vel linearia 5-9 cm. longa 8 mm.-11 mm. lata recta vel leviter falcato-recurva apice obtusa basi acuta vel breve attenuata margine integerrima coriacea utraque glabra supra nitida subtus pallida haud glauca, costa supra acute elevata subtus leviter elevata subplana, petiolis brevissimis usque ad 5 mm. longis subalatis. Fructus ad axillas foliorum solitariter siti, pedicellis 2 mm. longis glabris erectis apice bracteis 2 instructis, bracteis triangularibus $1\frac{1}{2}$ mm. longis 1 mm. latis apice cuspidato-acutis dorso carinatis crassiusculis. Receptaculum carnosum oblique obconico-globosum medio tenuiter 2-lobatum 4 mm. longum totiusque latum, lobis apice breve apiculatis. Bacca oblique globosa 1 cm. longa 8 mm. lata apice apiculato-acuta glabra.

HAB. Nantō: Holisha, Toshōkō, leg. S. NAKAI, Dec. 1915.

Near *P. macrophylla*, but distinguishable from it in having ovate berries which are acute at the apex.

Orchideæ.

Cypripedium LINN.

Cypripedium formosanum HAYATA sp. nov. (Fig. 9.) *Cypripedium japonicum* HAYATA Ic. Pl. Formos. II. p. 136, (non THUNB.) Rhizoma repens ramosum; caulis basi ascendens et erectus basi vaginis 1-8 cm. longis 5-8 instructus medio 2-foliatus apice flore singulo terminatus 2-25 cm. longus. Folia quasiopposita obovato-rotundata 10-13 cm. longa 7-9 cm. lata apice rotundata vel late triangulari-acuta ad summum aristis instructa basi cuneata membranacea duplicato-plicata supra glabra subtus minute sparsissime brevissime hirsuta margine minute ciliolata subintegra vel minute erosa palmatinervia, nervis 11-13 radiatim divaricatis apice vena marginali conjunctis, venulis inter nervos circ. 9, sessilia, vaginis cylindrico-tubulosis 7 cm. longis subglabris. Flores solitarii, pedunculis 11 cm. longis subglabris vel sparse hirsutis apice bracteis singulis instructis erectis rectis, bracteis ovato-lanceolatis



Fig. 9, *Cypripedium formosanum* HAYATA; a, a flower; b, a lip seen from above; c, the same, seen from below; d, the same, in section; e, Column; f, staminode, seen from face; g, a stamen; h, the same, seen from side.

22 mm. longis 10 mm. latis sparse hirsutis vel subglabris basin ovarii amplexantibus. Ovarium 18 mm. longum subfusiforme 2 mm. latum 18 mm. longum dense hirsutum. Flores in alabastro pallido-flavescentes per anthesin

leviter purpurascens. Sepalum posticum distinctum subalbum ovato-lanceolatum $4\frac{1}{2}$ cm. longum 2 cm. latum apice acutum vel obtusum integrum utraque pagine glabrum sed ad marginem inferiorem ciliatum parallero-nervium, sepala lateralia dua subalba se connata naviculiformia $4\frac{1}{2}$ cm. longa $2\frac{1}{2}$ cm. lata apice breve acuminata ad summum 2-apiculata basi leviter contracta intus glabra extus glabra margine inferiore ciliolata parallero-nervia. Petala plus minus obliqua ovato-lanceolata 5 cm. longa 18 mm. lata apice breve acuminata basi obtusa margine integra extus glabra intus deorsum hirsuto-barbata intus deorsum purpureo-maculata margine haud ciliolata. Labellum sessile patens inflato-calceoliforme $5\frac{1}{2}$ – $6\frac{1}{2}$ cm. longum 4 cm. latum $2\frac{1}{2}$ cm. altum, partibus basilaribus unguiculiformibus 1 cm. longis totiusque latis; lobi laterales ad basin calceoli subnulli; ore calceoli 17 mm. longo 7 mm. lato; calceolus intus prope fundum barbatus flavescens radiatim purpureo-maculatus. Columna brevis 1 cm. longa teres 2 mm. in diametro; antheræ perfectæ 2 ad latera rostelli fere sessiles 4 mm. longæque latæ subglobosæ, oculis parallelis contiguis; staminodium pone rostellum incumbens late laminiforme leviter purpurascens late sagittiforme 1 cm. longum 7 mm. latum apice breve cuspidatum basi sagittatum, facie loculos 2 imperfectos ferens. Rostellum inter antheras perfectas antrorsum inflexum crassiusculum obtriangulare 6 mm. latum 7 mm. longum margine utroque latere lobulis singulis brevissimis instructum, subtus papilloso-stigmatosum. Capsula ignota.

HAB. Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from *C. japonicum* in the nearly glabrous peduncles and less hairy ovaries, in the maculation of light purple dots, which dots in the Japanese species are nearly colorless and translucent. In the living specimens, the Japanese and Formosan plants are easily distinguishable; the flowers of the former are more or less brownish, while those of the latter are whitish. In the Japanese species the leaves are nearly quite expanded when flowering, but in the Formosan, they are partly folded, but not quite expanded.

***Microstylis* NUTT.**

***Microstylis arisanensis* HAYATA** sp. nov. (Pl. XI. et fig. 10). Terrestis? Radices e basi pseudobulbi oriundæ incrassatæ numerosæ. Pseudobulbi annotini ellipsoidei 7 mm. longi 5 mm. lati apice rotundati plus minus

complanati subnudi; hornotini minores 3-4 mm. longi totiusque lati apice caulem singulum emittentes. Caulis simplex subtereto-complanatus anguste alatus cum racemo 7-15 cm. longus medio cum alis circ. 1 mm. latus basi cum pseudobulbo squamis scariosis 2-3 involutus glaber, squamis superioribus vaginiformibus tubiformibus, tubis $1\frac{1}{2}$ mm. longis 4 mm. latis apice obtusis, basi folio singulo instructus rarius 2-foliatus, tunc altro majore altro multo minore. Folia generaliter solitaria petiolata, lamina oblongo-ovata $5\frac{1}{2}$ cm. longa 3 cm. lata apice obtusissima basi obtusa membranacea utraque glabra margine integerrima basi ad petiolum gradatim abeunti, petiolis medio deorsum vaginiformibus cum vaginis $2\frac{1}{3}$ mm. longis membranaceis plicatis. Pars florifera racemi 2-8 cm. longa laxiuscule florifera, bracteis lanceolatis 2-3 mm. longis apice acuminatis; pedicelli ovario excepto 3 mm. longi glabri; ovarium cylindricum $1\frac{1}{4}$ mm. longum $\frac{1}{2}$ mm. latum glabrum haud tortuosum, segmentis floris patentissimis. Sepalum posticum lanceolato-ovatum 3 mm. longum $1\frac{1}{4}$ mm. latum apice lineari-acuminatum ad summum obtusum basi leviter contractum intus convexum extus concavum tenuiter 1-nervium glabrum; lateralia cum postico conformia sed paulo breviora obliquaque. Petala linearia $2\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata apice acuminata 1-nervia glabra exteriore valde reflexa. Labellum triangulare 3 mm. longum 2 mm. latum apice cuspidato-acuminatum basi leviter cordatum margine prope basin interiore recurvum, discis 2 linearibus a basi labelli usque ad infra cuspidem extensis a se $\frac{2}{3}$ mm. distantibus botryoideo-tuberculatis, subtus toto glabrum supra a disco exteriore hirsutum cæterum glabrum basi brevissime unguiculatum, inter unguem et laminam lamella brevissima instruc-



Fig. 10, *Microstylis arisanensis* HAYATA.

Fig. 10, *Microstylis arisanensis* HAYATA. ovario excepto 3 mm. longi glabri; ovarium cylindricum $1\frac{1}{4}$ mm. longum $\frac{1}{2}$ mm. latum glabrum haud tortuosum, segmentis floris patentissimis. Sepalum posticum lanceolato-ovatum 3 mm. longum $1\frac{1}{4}$ mm. latum apice lineari-acuminatum ad summum obtusum basi leviter contractum intus convexum extus concavum tenuiter 1-nervium glabrum; lateralia cum postico conformia sed paulo breviora obliquaque. Petala linearia $2\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata apice acuminata 1-nervia glabra exteriore valde reflexa. Labellum triangulare 3 mm. longum 2 mm. latum apice cuspidato-acuminatum basi leviter cordatum margine prope basin interiore recurvum, discis 2 linearibus a basi labelli usque ad infra cuspidem extensis a se $\frac{2}{3}$ mm. distantibus botryoideo-tuberculatis, subtus toto glabrum supra a disco exteriore hirsutum cæterum glabrum basi brevissime unguiculatum, inter unguem et laminam lamella brevissima instruc-

tum tenuissime 5-nervium. Columna brevissima cum antheris $\frac{1}{2}$ mm. longa vel longior; anthera persistens erecta 2-locularis $\frac{1}{3}$ mm. longa $\frac{2}{3}$ mm. lata; pollinia 2 subquadrangulati-formia; clinandrium oblique truncatum, appendicibus lateralibus membranaceis $\frac{2}{3}$ mm. latis $\frac{2}{5}$ mm. longis erectis; rostellum late triangulare acutum. Stigma rotundato-cavum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Junio 1914, No. 924.

Near *Microstylis monophyllos* LINDL., but distinguishable from it in having nearly rounded lateral lobes of the lips.

Dendrobium Sw.

Dendrobium PèreFauriei HAYATA sp. nov. Caulis erectus 60 cm. longus basi teres 3 mm. in diametro parte inferiore excepta medio sursumque tumidus 7 mm. in diametro, internodiis $2\frac{1}{2}$ –3 cm. longis, sursum foliatus et floratus. Folia oblongo-lanceolata 6–7 cm. longa $1\frac{1}{2}$ cm. lata apice obtusa ad summum breve apiculata basi plus minus obliqua in exsiccatō chartacea margine integra 5-nervia, venulis 3 inter nervos parallelis, basi cum vaginis articulata, vaginis 2 cm. longis internodium amplexantibus. Racemi circ. 6 cm. longi 3–4-florati ad latus apicis internodii siti, bracteis oblongis acuminatis 3 mm. longis, pedicellis cum ovariis 18 mm. longis. Sepalum posticum ovato-oblongum 15 mm. longum 6 mm. latum apice obtusum basi plus minus contractum tenuiter 5-nervium; lateralia oblique triangulati-oblonga 16 mm. longa basi latissima 1 cm. lata apice acuta vel triangulati-acuta margine fere recta basi cum pede columnæ connata mentum 1 cm. longum 3 mm. latum formantia. Petala oblonga 15 mm. longa 7 mm. lata apice acutissima basi cuneato-contracta tenuiter 5–7-nervia integra. Labellum in ambitu rhomboideum $1\frac{1}{2}$ cm. longum 1 cm. latum apice obtusissimum basi cuneatim contractum basi erectum medio subito reflexum fere elobatum medio sursum intus minute hirsutum a medio deorsum glabrum margine integrum infra medium medio callo uno crasso disciformi instructum extus glabrum. Columna brevissima 2 mm. longa vel subnulla haud alata, basi ad pedem 1 cm. longum 3 mm. latum apice anteriore recurvum producta.

HAB. Kwarenkō, leg. U. FAURIE, Juli. 1915.

Dendrobium sanseiense HAYATA sp. nov. Epiphytica; rhizoma cum pseudobulbis compositum longe repens squamis dense obtectum, pseudobulbis

subhorizontaliter sitis apice ascendentibus obovoideo-fusiformibus 2 cm. longis 4 mm. latis apice obtusissimis basi longe attenuatis apice 1-foliatis cum foliis articulatis. Folia coriacea oblonga vel obovato-oblonga $1\frac{1}{2}$ –2 cm. longa 8–10 mm. lata apice rotundata ad centrum emarginata vel brevissime 2-lobata basi subito ad petiolum attenuata margine integerrima deorsum recurva supra nitidissima subtus pallida costa supra impressa subtus elevata, petiolis 3 mm. longis. Flores singuli solitarii pedunculati, pedunculis ab apice pseudobulbi oriundis 1 cm. longis glabris erectis basi bracteis vaginiformibus et medio bracteis singulis instructis, bracteis mediis lanceolatis glabris $2\frac{1}{2}$ mm. longis apice obtusis glabris basi rhachem complete amplexantibus. Flores solitarii. Ovarium cylindricum pedunculo haud latius. Sepalum posticum ovato-lanceolatum 6 mm. longum $2\frac{1}{2}$ mm. latum apice acuminatum ad summum obtusum basi leviter constrictum supra basin latissimum 5-nervium utraque glabrum; lateralia obliquissima triangulari-lanceolata 8–9 mm. longa basi latissima 3 mm. lata cum pede columnæ connata mentum 3 mm. longum formantia apice acuminatissima utraque glabra 5-nervia. Petala triangulari-lineararia 5 mm. longa basi latissima 2 mm. lata apice acuminato-obtusa glabra 5-nervia basi partim ad columnam partim ad pedem columnæ adnata. Labellum in ambitu obovato-oblongum 9 mm. longum 4 mm. latum 3-lobatum, lobis lateralibus semi-oblongis 2 mm. latis margine integris in ambitu semi-rotundatis, lobo terminali subrotundato 3–4 mm. in diametro apice breve apiculato basi contracto margine minute eroso, discis 2 \wedge -formibus infra lobum terminalem dispositis, nervis centralibus 7–9 parallelis, venis lateralibus contra marginem radiatim divaricatis. Columna 2 mm. longa prominente lateque alata, (alis a medio menti usque ad apicem columnæ extensis), basi ad pedem 4 mm. longum $1\frac{1}{2}$ mm. latum producta. Anthera oblonga $1\frac{1}{2}$ mm. longa.

HAB. Giranchō: Mt. Sanseizan, leg. B. HAYATA, Mai. 1916.

Near *Dendrobium Nakaharai* SCHLECHTER; but quite separable from it in the much smaller leaves and flowers.

Dendrobium Somai HAYATA sp. nov. Epiphytica. Caules caespitosi recti erecti circ. 60 cm. longi teretes medio 2 mm.– $2\frac{1}{2}$ mm. in diametro nodosi, internodiis 2– $2\frac{1}{2}$ cm. longis reliquis vaginarum toto obtectis, superioribus brevioribus superiore foliiferis. Folia lanceolato-lineararia 7 mm. longa 5 mm.

lata apice acuminata basi contracta margine integra, nervis 3 distinctis venulis inter nervos numerosis, vaginis cum internodio æquilongis tubuliformibus circ. $1\frac{1}{2}$ cm. longis 2 mm. latis, ad latus oris auriculis singulis instructis, auriculis late semi-rotundatis 2 mm. latis 1 mm. longis emarginatis. Flores gemini e latere internodii oriundi furcato-pedicellati. Pedunculi 4 mm. longi basi vaginati, vaginis latere valde complanatis lineari-oblongis 5 mm. longis $2\frac{1}{2}$ mm. latis apice rotundatis latere uno fissis coriaceis, vaginis intimis tenuissimis membranaceis hyalinis 4 mm. longis 2 mm. latis ore obliquissimis, pedicellis 5 mm. longis glabris; ovario cylindrico-obconico 4 mm. longo $1\frac{1}{2}$ mm. lato glabro. Sepalum posticum lineari-lanceolatum 13 mm. longum $2\frac{1}{2}$ mm. latum apice acuminatissimum 7-nerviū basi haud vel vix contractum glabrum; lateralialia cum postico æquilonga obliqua basi latissima cum pede columnæ mentum 4 mm. longum formantia. Petala angustissime linearia 13 mm. longa 1 mm. lata apice acuminatissima basi haud contracta 3-nervia glabra. Labellum ovatum 13 mm. longum 5 mm. latum medio sursum 3-lobatum, lobo terminali ovato 6 mm. longo 4 mm. lato apice cuspidato-acuminato margine crispulato, trinerviū, nervis parallelis, secus nervos elevato-lamellatum, lamellis fimbriatis, disco a basi labelli usque ad medium extenso lineari 6 mm. longo $\frac{1}{2}$ mm. lato crassiusculo glabro, lobis lateralibus obliquis cum lobo centrali contactis oblongo-triangularibus apice obtuso-acutis $1\frac{1}{2}$ mm. latis latere interiore 1 mm. longis glabris margine sub-integris. Columna $2\frac{1}{2}$ mm. longa $1\frac{1}{2}$ mm. lata.

HAB. in seminario Taihoku culta, leg. T. SÔMA, Aug. 1915, (fl.)

Near *D. furcatopedicellatum* HAYATA, but differs from it by the smaller flowers with glabrous discs.

Bulbophyllum THOU.

***Bulbophyllum Saruwatarii* HAYATA sp. nov.** *Cirropetalum Saruwatarii* HAYATA. Epiphytica. Rhizoma repens teres. Pseudobulbus ampulliformis $2\frac{1}{2}$ cm. longus $1\frac{1}{2}$ cm. latus ovoideus glaber pallidus. Folia solitaria lineari-lanceolata crasse coriacea 7 cm. longa 14 mm. lata apice obtusa vel rarius brevissime 2-lobata basi ad petiolum 1 cm. longum abeuntia. Scapi e basi pseudobulbi oriundi 10 cm. longi ascendentes squamis vaginiformibus secus longitudinem totam 2-3 instructi, squamis vaginiformibus 1 cm. longis, apice flores 5-6 subcapitatum gerentes, sub flore singulo bractea una instructi, bracteis lanceo-

latis 8 mm. longis secus longitudinem plicatis apice acutis vel obtusis glabris tenuibus naviculiformibus pedicellum amplexantibus, pedicellis gracilibus 2 cm. longis subradiatim divaricatis. Flores pallido-lacteo-flavi vel plus minus pallido-viridescentes vel rubescentes. Sepalum posticum ovatum 1 cm. longum 5 mm. latum basi plus minus contractum glabrum concavum, lateralia basi obliqua lineari-lanceolata $1\frac{1}{2}$ cm. longa 5 mm. lata apice acuminata integra \pm convoluta dua se firme margine interiore paralleliter contigua. Petala plus minus obliqua 7 mm. longa 5 mm. lata ovata apice rotundata 5-nervia. Labellum ovatum 6 mm. longum 4 mm. latum minute hirsutum crassiusculum basi secus longitudinem plicatum margine sursum valde exteriore recurvum apice obtusum medio subito deorsum recurvum basi subito valde contractum. Columna subnulla a basi usque ad apicem antheræ $3\frac{1}{2}$ mm. longa ad latus antérieur prominente alata, alis late triangulari-formibus 2 mm. longis 1 mm. latis, basi ad pedem 6 mm. longum productum, pede lineari 6 mm. longo 1 mm. lato apice sursum subito recurvo. Clinandrium utroque latere appendiculis instructum, appendiculis linearibus cuspidiformibus 1 mm. longis.

HAB. Keitao, leg. B. HAYATA, ad 4000 ped. alt., Aprili. 1916.

Near *B. omerandrum* HAY., but distinguishable from it by the entire petals.

Bulbophyllum transarisanense HAYATA n. n. *B. viridiflorum* HAYATA Ic. Pl. Formos. II. p. 133 (non SCHLECHTER).

Eria LINDL.

Eria arisanensis HAYATA Ic. Pl. Formos. III. p. 54 t. 12. Descriptio aucta: Pollinia 8, in loculo singulo 4 superposita.

Acanthephippium BLUME.

Acanthephippium Yamamotoi HAYATA sp. nov. Terrestris. Pseudobulbi ovoidei 7 cm. longi 3–4 cm. lati apice plus minus rostrati vel haud rostrati 2–3-nodosi, basi radices teretes incrassatas abundanter emittentes. Caulis foliifer haud floratus ad apicem pseudobulbi terminalis circ. 10 cm. longus teres singulus basi vaginatus. Folia 2–3 ampla basi vaginata, vaginis 8–9 cm. longis nervosis, laminis oblongo-ellipticis 30 cm. longis 8 cm. latis apice acuminatis basi acuto-obtusis subito ad vaginam abeuntibus membranaceis nervosis, nervis lateralibus utroque latere costæ 4, venis inter nervos laterales circ. 7, margine

integrus. Caulis florifer in specimine nostro 20 cm. longus vaginis multis toto involutus; foliis nondum evolutis, pseudobulbo parvo, racemo ascendenti singulo lateraliter ad latus apicis pseudobulbi sito 10 cm. longo 3-4-florifero plus minus purpurascenti, bracteis ovatis vel oblongis naviculiformibus $2\frac{1}{2}$ cm. longis, pedicellis glabris cum ovariis 4 cm. longis subteretibus sursum 4 mm. latis. Flores majusculi 4 cm. longi 3 cm. lati extus albo-flavescentes intus rubropunctati. Sepala lata carnosa in urceolum obovatum obconicum 4 cm. longum 2 cm. latum cohærentia apice libera; posticum fornicatum, parte libera late triangulari apice obtusa; lateralialia latere anteriore ab apice usque ad mentum libera basi ad pedem columnæ adnata mentum obconicum 2 cm. longum formantia. Petala sepalis inclusa, ad basin columnæ adnata sepalis multo angustiora basi cum marginibus membranaceis pedis columnæ continua oblonga $2\frac{1}{2}$ cm. longa $1\frac{1}{2}$ cm. lata apice obtusa basi cuneato-angustata. Labellum ad apicem pedis columnæ articulatum situm inflexum sepalis inclusum 3-lobatum, lobis lateralibus latis erectis supra minute hirsutis, lobo medio lineari crassiusculo supra valde rugosissimo apice breve apiculato. Columna brevis $1\frac{1}{2}$ cm. longa 7 mm. lata basi in pedem longissimum $1\frac{1}{2}$ cm. longum medio incurvo-inflexum sursum liberum abeuns, partibus liberis $2\frac{1}{2}$ cm. longis 5 mm. latis.

HAB. Uraisha, leg. K. YAMAMOTO.

Near *A. sylhetense* LINDL. (Ann. Roy. Bot. Gard. Calc. VIII. t. 154); but different from it in the much longer ovariis and in the discs of the lips.

Phajus LOUR.

Phajus grandifolius LOUR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 410.

HAB. Suisha, leg. B. HAYATA, Mai. 1916. Note:—Segments pale green on the back, but red-purple inside; lip purple towards the tip.

Phajus Somai HAYATA sp. nov. Terrestis. Caulis foliifer distinctus cum foliis 110 cm. longus 7-8-foliatus basi pseudobulbatus, pseudobulbo elongato-ovoideo 5 cm. longo 2 cm. lato pallido-viridi basi dense radicefero basi inferiore haud vaginato. Folia suberecta inferiora minora superiora majora, lamina membranacea fusco-viridi integra 5-nervia, venulis inter nervos 8-15, lanceolata majora 50 cm. longa 9 cm. lata apice acuminata basi gradatim atte-

nuata ad petiolum abeunti, petiolis superioribus petioli-formibus, inferioribus vagini-formibus in longitudine variabilibus circ. 23 cm. longis caulem complete amplexantibus. Caulis florifer distinctus aphyllus vaginatus circ. 80 cm. longus erectus rectus inferiore 12 mm. in diametro sectionis, vaginis inferioribus 4 cm. superioribus 7 cm. longis ore obliquis apice rotundatis vel obtusissimis membranaceis, partibus floriferis 25 cm. longis laxè floratis, bracteis lineari-lanceolatis $3\frac{1}{2}$ cm. longis apice acutis 5 mm. latis concavis ascendentibus, pedicellis (cum ovariis) $2\frac{1}{2}$ –3 cm. longis ascendentibus toto glabris. Flores majusculi flavi toto glabri 3–4 cm. longi. Sepalum posticum oblanceolatum 4 cm. longum 12 mm. latum apice acutum basi haud vel vix contractum; sepala lateralibus quam postico breviora plus minus obliqua 33 mm. longa 12 mm. lata apice acuta basi obliqua basi latere superiore obtusa basi latere inferiore cordata vel auriculata toto glabra. Petala oblanceolata obliqua 33 mm. longa 12 mm. lata apice acuta basi angustata margine integra plus minus falcatis deorsum recurva. Labellum glabrum in ambitu obovato-obtriangulare 3 cm. longum basi erectum medio sursum recurvum, lobis lateralibus erectis latis columnam amplexantibus latere integris planis apice crispato-plicatis, lobo terminali latissimo margine validissime crispato-undulato-plicato; calcar brevis 5–6 mm. longo plus minus recurvo 1 mm. in diametro. Columna alba elongata 18 mm. longa semi-teres subulata facie anteriore hirsuta. Pollinia 8.

HAB. Urai, leg. B. HAYATA et T. SÔMA, Mai. 1916.

Near *Phajus maculatus* LINDL. (Ann. Roy. Bot. Gard. Calc. VIII. t. 149); but differs from it in having much longer and looser racemes and in the yellowish lips which are not brown-colored at the margin.

***Bletilla* REICHB.**

***Bletilla formosana* (HAYATA) SCHLECHT.** *Bletia formosana* HAYATA Mater. Fl. Formos. p. 323.

HAB. Kaukaukei, leg. B. HAYATA, Mai. 15, 1916. Note:—Flowers nearly white or very slightly purple.

***Tainia* BLUME.**

***Tainia Shimadai* HAYATA sp. nov.** (Pl. VII. et fig. 11). Rhizoma repens 3 mm. crassum. Pseudobulbus elongato-ovoideo-ampulliformis $3\frac{1}{2}$ cm.

longus 7 mm. latus glaber apice rostrato-elongatus folio solitario terminatus basi squamis vaginiformibus duobus atro-purpureis instructus. Folia solitaria ex apice pseudobulbi oriunda procumbentia haud erecta elongato-lanceolata cum petiolis 43 cm. longa $3\frac{1}{2}$ cm. lata apice acuminata basi longe gradatimque attenuata, (partibus attenuatis petioliformibus, partibus petioliformibus 4-5 cm. longis secus medium plicatis versus basin perfecte tubiformibus, partibus tubiformibus 7 mm. longis ad extremitatem plus minus dilatatis), membranacea 3-nervia, (venis inter nervos circ. 9, venulis transversis inter venas remote sitis a se circ. 5 mm. distantibus), utraque pagine glabra margine integra. Scapi gracillimi erecti aphylli glabri pallido-viridi-purpurascens e basi pseudobulbi oriundi circ. 40 cm. longi, basi deorsum



Fig. 11, *Tainia Shimadai* HAYATA, photographed by Mr. Y. SHIMADA.

vaginis paucis instructi, (vaginis 4-5 cm. longis tubuliformibus 6 mm. latis glabris nervosis semi-hyalinis ore obliquis apice acutis vel truncatis), medio sursum nudi haud vaginati squamis minutis 1-2 instructi, partibus floriferis 8-11 cm. longis gracillimis remotiuscule floratis; bracteis sub flore singulis, linearibus lanceolatis 3-6 cm. longis acuminatis. Flores racemosi, pedicellis (ovario excepto) 7 mm. longis subpatentibus. Ovarium cylindricum 4 mm. longum glabrum plus minus purpurascens apice 2 mm. latum basi ad pedicellum abeuns sulcatum glabrum apice haud contractum. Sepala pallido-purpurascens purpureo-striata, posticum lineari-oblongum 15 mm. longum apice obtusum $2\frac{1}{2}$ mm. latum 3-nervium basi attenuatum $1\frac{1}{2}$ mm. latum; lateralia valde falcata linearia plus quam 10 mm. longa 2 mm. lata apice acuto-obtusa basi haud attenuata 2 mm. lata caeterum ut postico. Petala linearia 12 mm. longa $2\frac{1}{2}$ mm. lata apice obtusa basi haud contracta $2\frac{1}{2}$ mm. lata plus minus falcata glabra 3-nervia. Labellum flavum sub sinibus pur-

pureo-maculatum subtus flavum in ambitu obtriangulare 11 mm. longum 8 mm. latum basi triangulari-acutum cum pede columnæ articulatam basi erectam ad 4 mm. altitudinem subito reflexam deorsum recurvam patens, parte patenti (i. e. lamina) late rotundata 8 mm. longa 9 mm. lata 3-lobata, (lobo terminali latissimo $2\frac{1}{2}$ mm. longo $7\frac{1}{2}$ mm. lato apice truncato ad centrum brevissime latissimeque triangulari-acuto, lobis lateralibus ascendentibus plus minus interiore recurvis obtusissimis 2 mm. latis, sinibus inter lobos latiusculis $1\frac{1}{2}$ mm. latis truncatis), glabra medio discis 3-lamellatis flavis integris instructa. Columna erecta 7 mm. longa circ. 2 mm. lata apice alata basi ad pedem producta, pede 2 mm. longo cum sepalis lateralibus connato mentum formanti; anthera latiuscula antice truncata postice cordato-cornuta, cornibus late triangulari-obtusis crassiusculis purpureis.

HAB. Taihoku: Tikushizan, leg. Y. SHIMADA, Aprili. 1915, fl.

Near *Tainia laxiflora* MK., but differs from it in the very much longer leaves.

Calanthe R. BR.

Calanthe raishænsis HAYATA sp. nov. Terrestris. Folia basi racemi circ. 3 fasciculata, fasciculo squamis 1-2 vaginiformibus involuto, cum petiolis 60 cm. longa suberecta glabra, lamina oblanceolata 30-40 cm. longa $6\frac{1}{2}$ cm. lata apice subito acuminata vel acuta basi gradatim longeque attenuata ad petiolum circ. 30 cm. longum abeunti tenuiter membranacea. Racemi circ. 60 cm. longi erecti folio æquilongi simplices e centro fasciculi foliorum oriundi glabri, partibus floriferis 12 cm. longis laxè floratis, bracteis linearilanceolatis acuminatis 1-2 cm. longis, pedicellis (cum ovariis) 3-4 cm. longis. Sepalum posticum ovato-lanceolatum 3 cm. longum 8 mm. latum fere 5-nerviū apice acuminatissimum basi rotundatum contractum glabrum; lateralia quam posticum longiora 33 cm. longa 1 cm. lata oblongo-lanceolata apice acuminatissima basi obtusa integra glabra. Petala linearia $2\frac{1}{2}$ cm. longa 3 mm. lata apice acuminata basi haud contracta 3-nervia. Labellum late rotundatum 22 mm. latum 18 mm. longum 3-lobatum, (lobis lateralibus subrotundatis 5 mm. longis

totiusque latis apice rotundatis interiore recurvis, lobo terminali obtriangulari 1 cm. longo totiusque lato apice margine crispato-plicato ad centrum apicis cuspidate 3 mm. longo instructo toto subglabro), basi ad calcar productum, calcare cum partibus labelli columna connatis $3\frac{1}{2}$ cm. longo intus extusque plus minus hirsuto deorsum recurvo. Columna 1 cm. longa basi labello connata tubum formans. Anthera triangularis 3 mm. longa totiusque lata apice cuspidate $1\frac{1}{4}$ mm. longo obtuso instructa basi segittate 2-lobato.

HAB. Raisha, in sylvis 3300 ped. alt., No. 905, Mart. 1914, leg. U. FAURIE.

Near *Calanthe arisanensis* HAYATA, but differs from it in having broader spurs and less crispate lips.

Eulophia R. BR.

Eulophia ochobiensis HAYATA sp. nov. Terrestis aphylla. Tuber ellipticum 10 cm. longum 4 cm. latum abundanter radiciferum, radicibus teretibus incrassatis. Scapi simplices cum racemis 40 cm. longi erecti glabri 7–8 mm. in diametro pallido-purpurei basi squamati, squamis oblongis 2 cm. longis imbricatis apice obtusis vel acutis, racemis vel partibus floriferis 10 cm. longis laxiuscule floriferis, bracteis lanceolatis 3 cm. longis 6 mm. latis apice acuminatis purpureis, pedicellis cum ovariis 6–10 mm. longis glabris. Sepala purpurea; sepalum posticum oblongo-ovatum 17 mm. longum 7 mm. latum apice acutum basi contractum glabrum, lateralia oblique oblongo-ovata 18 mm. longa 7 mm. lata apice acuminata. Petala pallido-flava oblique obovata 11 mm. longa 7 mm. lata apice triangulari-acuta vel obtusa basi breve lateque cuneata ad insertionem 3 mm. lata. Labellum pallidum extus glabrum intus medio apiceque hirsutum late cuneato-triangulare $1\frac{1}{2}$ cm. longum 12 mm. latum apice late breveque 3-lobatum, lobo terminali triangulari 4 mm. longo totiusque lato apice obtuso, lobis laterilibus apice rotundatis, basi brevissime calcaratum. Columna dorso complanata 6 mm. longa 3 mm. lata pallido-flava.

HAB. Ōchōbi, B. HAYATA, Mai. 13, 1916.

Near *Eulophia macrorhiza* (BLUME Fl. Jav. t. 63 f.-2).

Cymbidium Sw.

***Cymbidium arrogans* HAYATA** (Fig. 12) Ic. Pl. Formos. IV. p. 76.



Fig. 12, *Cymbidium arrogans* HAYATA.
 Photographed by Mr. Y. SHIMADA.

Cymbidium albo-jucundissimum HAYATA (Fig. 13) Ic. Pl. Formos. IV. p. 74.



Fig. 13, *Cymbidium albojucundissimum* HAYATA.
Photographed by Mr. Y. SHIMADA.

vaginis usque ad medium tubiformibus cum tubo 5-7 cm. longis apice acuminatis, partibus floriferis circ. 15 cm. longis laxe floratis, bracteis lanceolatis 3 cm. longis

Cymbidium oiwakensis

HAYATA sp. nov. (Fig. 14).
Terrestris, radicibus incrassatis.
Folia 7-8-fasciculata, fasciculis basi squamis involutis, linearia 50-60 cm. longa 5-6 mm. lata apice acuta margine præsertim apice minute serrulata nervis manifestis 3, venulis inter nervos 1-2. Racemi distincti aphylli circ. 50 cm. longi foliis æquilongi basi et parte inferiore vaginis instructi,

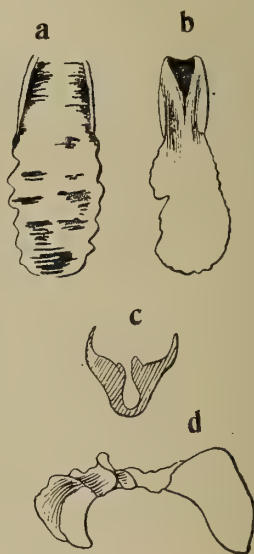


Fig. 14, *Cymbidium oiwakense* HAYATA; a, a lip, showing maculation on the surface; b, the same, showing the disc at the base; c, the same in section; d, the same lip, seen from side.

sursum recurvis ascendentibus glabris apice acuminatis valde concavis, pedicellis (cum ovariis) 2 cm. longis glabris. Flores 4 cm. in diametro. Sepala et petala pallido-viridescencia vel pallido-flavescentia extus purpureo-striata vel haud striata. Labellum fusco-purpureo-maculatum. Sepala lanceolata 27 mm. longa 6-7 mm. lata apice triangulari-acuta basi plus minus angusta glabra. Petala plus minus obliqua ovato-lanceolata 23 mm. longa 8 mm. lata apice acuto-obtusa basi plus minus contracta glabra. Labellum in ambitu ovatum 23 mm. longum ad basin columnæ situm sessile erectum basi concavum, lobis lateralibus latiusculis erectis apice rotundatis semi-oblongis 3 mm. latis columnam laxè amplexantibus, labo medio valde recurvo oblongo 13 mm. longo 8 mm. lato apice obtusissimo margine valde crispato sub lente minute crosso. Disci 2 ()-formiter dispositi. Columna complanato-semi-teres 14 mm. longa 4 mm. lata margine obscure alata vel haud alata. Fructus fusiformis 4 cm. longus $1\frac{1}{2}$ cm. latus erectus, stipite $1\frac{1}{2}$ cm. longo erecto glabro.

HAB. Gökwanzan Oiwake, ad 7500 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from the other species of this genus in Formosa in having manifestly denticulate lips.

Cymbidium rubrigemmum HAYATA sp. nov.

(Fig. 15). Folia linearia tenuiter coriacea 30-40 cm. longa 7 mm. lata apice acuminata basi gradatim attenuata margine sub lente minutissime serrulata, nervis distinctis 3. Scapi



Fig. 15, *Cymbidium rubrigemmum* HAYATA.
Photographed by Mr. T. SÔMA.

cum racemis 25–30 cm. longi erecti basi squamis 3–4 instructi, squamis a se 5 cm. distantibus 5–6 cm. longis apice acuminatis a basi usque ad medium tubiformibus. Racemi 8 cm. longi pauciflorati, bracteis lanceolatis 3 cm. longis 4 mm. latis purpureis, pedicellis cum ovario 2 cm. longis glabris gracilibus.



Fig. 17, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA. Photographed by Mr. T. SÔMA.

Sepala subæqualia linearia 3 cm. longa 5 mm. lata apice acuta basi leviter contracta. Petala lanceolata plus minus obliqua $2\frac{1}{2}$ cm. longa 6–7 mm. lata. Labellum oblongo-ovatum 20 mm. longum 8 mm. latum apice obtusum apice margine maculatum. Columna $1\frac{1}{2}$ cm. longa.

HAB. Taihoku cult. Mart. 1914, leg. T. SÔMA.

Near *Cymbidium oreophyllum* HAYATA, but distinguishable from it in having shorter and broader sepals.

Cymbidium sinense WILLD. var. ***margicoloratum*** HAYATA n. v. (Fig. 16–b et 17). Folia lineari-oblongeolata tenuiter coriacea 50–60 cm. longa 2 cm.



Fig. 16, a, *Cymbidium rubrigemmum* HAYATA; b, *Cymbidium sinense* WILLD. var. *margicoloratum* HAYATA.

lata apice acuminata basi gradatim attenuata ad extremitatem subito dilatata apicem pseudobulbi amplexantia, nervis distinctis 3, utraque pagine glabra margine integerrima. Scapi cum racemis 70–80 cm. longi teretes basi squamis 3–4 remote instructi, squamis a se 10 cm. distantibus linearibus apice acuminatis a basi usque ad medium tubuliformibus glabris scariosis 10 cm. longis nervosis. Racemi 30 cm. longi erecti recti remote floriferi, floribus a se 3–4 cm. distantibus, bracteis lanceolatis 1–2 cm. longis acuminatis, pedicellis (cum ovario) 3–2 cm. longis divaricatis. Sepalum posticum lineare 33 mm. longum 5 mm. latum apice obtuso-acutum, lateralia leviter breviora æquilata. Petala lanceolata $2\frac{1}{2}$ cm. longa 7 mm. lata apice obtusa basi contracta. Labellum ovatum 20 cm. longum 10 mm. latum apice acutum (discis 2-lamellatis) margine apiceque coloratum. Columna 13 mm. longa.

HAB. Taihoku cult. leg. T. SÔMA, Feb. 1914.

Differs from the type in the lips which in this new species are bluish purple at the margin, but not spotted. The lips of *C. sinense* are in greater parts spotted. I have not seen the type of the latter; but according to the description given in LINDL. Gen. et Sp. Orch. p. 162, the lips are “maculatum.” The same character of the lips can be seen in a figure given in the Sômokudsusetsu XVIII. Pl. 11.

Sarcochilus R. BR.

Sarcochilus kusukusensis HAYATA sp. nov. Epiphytica. Caulis 2–3 cm. longus toto foliatus vaginis foliorum imbricatis obtectus glaber. Folia in exsicato coriacea linearia 4–5 cm. longa 5–6 mm. lata apice obtusa vel obtusissima ad summum oblique simpliciter apiculata vel breve 2-apiculata basi angustiora margine integra, nervis lateralibus utroque latere costæ 5, vel 1 tum venis inter costas et nervas laterales 1–2, vaginis valde reflexis apice petioli-formibus basi vaginiformibus glabris. Racemi quasi-axillares cum pedunculis 4 cm. longi glabri erecti recti, pedunculis $3\frac{1}{2}$ cm. longis, rhachibus plus minus incrassatis densissime floriferis 1 cm. longis dense bracteatis, bracteis sub flore singulo unis instructis dense imbricatis cuspidato-triangularibus 3–4 mm. longis glabris dorso acute carinatis in sectione triangularibus, pedicellis cum ovariis 5 mm. longis glabris supra basin articulatis. Flores flavi 5 mm. longi. Sepala flava, posticum oblongum vel oblongo-obovatum $4\frac{1}{2}$ mm. longum 2 mm. latum apice obtusum basi-

contractum glabrum tenuiter membranaceum 3-nerviū; lateralīa postico æquilongā sed latiora plus minus obliqua basi cum pede columnæ connata mentum 1 mm. longum absuntia. Petala flava obovato-oblonga 4 mm. longa 2 mm. lata apice obtusissima basi cuneato-contracta. Labellum album purpureo-striatum pede columnæ articulatim affixum 3 mm. longum sacciforme; lobi laterales erecti late triangulares; medius obsoletus ad apicem denticulatus et plus minus carnosus; labellum medio et utroque latere apicis callis dense pilosis instructum, et protuberantibus duobus sub apice labelli dispositis. Columna brevis $1\frac{1}{2}$ mm. longa basi ad pedem 1 mm. longum producta.

HAB. KUSUKUSU, leg. B. HAYATA, Aug. 1914.

Differs from *S. formosana* HAY. by the far much smaller flowers with yellowish sepals and purple-striate lips.

Sarcophilus Saruwatarii HAYATA sp. nov. (Fig. 18). Epiphytica. Caulis 2 cm. longus toto foliatus et vaginis foliorum imbricatis obtectus glaber.

Folia alterna distiche disposita plana in exsiccato membranacea linearia vel lineari-oblancoolata 4–5 cm. longa 5–8 mm. lata apice obtusa vel acuta oblique 2-lobata vel integra margine integra basi attenuata cum vaginis articulata, nervis lateralibus utroque latere costæ 3, vaginis 3 mm. longis. Racemi penduli quasi-axillares graciles cum pedunculis 2–3 cm. longi, rhachibus 1 cm. longis valde flexuosis laxissime floratis, floribus 2–3, sub flore 1-bracteatis, bracteis

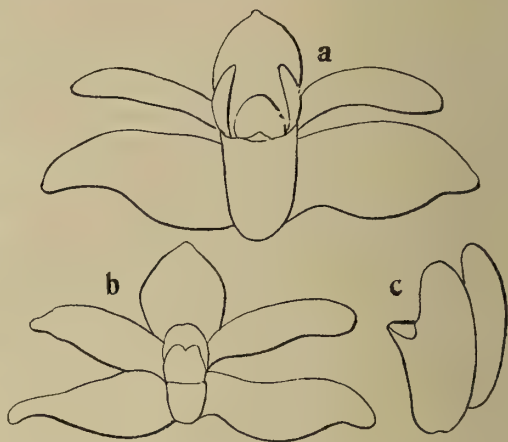


Fig. 18, *Sarcophilus Saruwatarii* HAYATA; a, a flower; b, another flower, lip taken off, showing the foot of the column; c, a lip, seen from side.

ovato-lanceolatis deorsum falcatis recurvis 2 mm. longis transverse patentibus secus costam plicatis alabastrum florum et rhachem racemi amplexantibus. Flores albi. Sepala inæqualia, posticum oblongum 5 mm. longum apice obtusum basi plus minus contractum; lateralīa oblique ovato-oblonga 7 mm. longa 3 mm. lata apice obtusa basi haud vel vix contracta. Petala lineari-lanceolata

5 mm. longa 1 mm. lata apice obtusa basi haud vel vix contracta. Labellum intus rubro-flavum sacciforme, lobis lateralibus oblongis obliquis 3 mm. longis 2 mm. latis apice truncato-obtusis extus minute hirsutis margine minute crosis intus glabris, lobo medio crassissimo brevissimo triangulari $\frac{1}{2}$ mm. longo, sub lobo medio disco crasso uno insito; gibbo labelli in fundo densissime piloso. Columna brevissima $\frac{1}{2}$ mm. longa subalata cum alis $1\frac{1}{2}$ mm. lata basi ad pedem 2 mm. longum producta.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Approaches to *S. formosanus* HAY., but distinguishable from it by the far much smaller lips and racemose inflorescence.

Saccolabium BLUME.

Saccolabium formosanum HAYATA Mater. Fl. Formos. p. 336. Descriptio aucta: Fructus cylindricus pedicello excepto 2 cm. longus 5 mm. latus utrinque contractus obtusus plus minus obliquus, pedicello 5–6 mm. longo.

Tropidia LINDL.

Tropidia Somai HAYATA sp. nov. (Pl. XIII.). Rhizoma ascendente-erectum ad caulem gradatim abeuns; pseudobulbus nullus. Caulis in nostro specimine 2–3-fasciculatus cum racemis 17–20 cm. longus glaber florifer suberectus interdum efoliatus interdum 1–2-foliatus eramosus basi usque ad medium 2–5-vaginato-squamatus, squamis inferioribus vaginiformibus 7 mm.–15 mm. longis ore obliquissimis apice acutis nervosis glabris superioribus longioribus usque ad $3\frac{1}{2}$ cm. longis ad medium tubuliformibus sursum lamini-formibus apice acuminatis, foliis si adsunt supra medium caulis 1–2-dispositis. Folia membranacea oblongo-cordata ovato-oblonga vel lanceolata 9–7 cm. longa 6–2 cm. lata apice acuminata ad summum breve aristata basi subcordata rotundata obtusa vel acuta semper ad petiolum $1-1\frac{1}{2}$ cm. longum caulem amplexantem gradatim abeuntia, margine integra 7-nervia, nervis supra minus subtus plus elevatis (in exsiccat). Racemi 3–4 cm. longi recti, bracteis lanceolatis 6–7 mm. longis apice acuminatis basi rhachin semi-amplexantibus glabris, pedicellis cum ovario 5 mm. longis glabris. Sepalum posticum lanceolatum 6 mm. longum basi latissimum acuminatissimum glabrum; lateralia apicibus exceptis perfecte connata ventricum formantia erecta apice acuminata lanceolata, ventrico sub insertione 2 mm. longo 2 mm. lato. Petala lanceolata sepalo postico breviora.

Labellum ovato-lanceolatum circ. 6 mm. longum erectum glabrum ventricosocalcaratum, lamina lanceolata 4 mm. longa. Columna 2 mm. longa, rostello obliquissimo triangulari-lanceolato apice 2-fido; anthera dorsalis e basi columnæ oriunda lanceolata apice acuminata 3 mm. longa $\frac{3}{4}$ mm. lata. Pollinia lineari-lanceolata 2 mm. longa apice attenuata ad caudiculam 2 mm. longam abeuntia; glandula lineari-oblonga 1 mm. longa. *Tropidia angulata* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 414 (non BLUME).

HAB. Akō: Datestu, leg. T. SŌMA, Juli. 1912.

Near *Tropidia angulata* BLUME (KING et PANTLING Orchid. t. 365), but distinguishable from it in having much inflated lips and sepals.

Spiranthes L. C. RICH.

Spiranthes australis LINDL. var. ***suishænsis*** HAYATA n. v. Terrestis. Radices incrassatæ e basi caulis 3–4 oriundæ teretes 5 cm. longæ 3 mm. crassæ. Caulis 30–50 cm. altus glaber teres basi foliis 2–3 medio squamis 1–2 instructus sursum ad spicam 10–20 cm. longam abeuns simplex haud ramosus. Folia inferiora majora oblanceolato-linearia 12–15 cm. longa 5–7 mm. lata apice obtusa vel acuta basi gradatim attenuata ad vaginam abeuntia, vaginis 1–6 cm. longis, toto glaberrima membranacea, nervis lateralibus utroque latere costæ 3, venulis obliquis reticulatis. Spicæ 10–20 cm. longæ simplices. Flores perfecte albi approximativè secundeque dispositi, bracteis post anthesin auctis lanceolatis. Ovarium obovoideum plus minus obliquum 2–3 mm. longum glabrum vel plus minus hirsutum. Rhachis tortuosa minute hirsuta, bracteis ovatis 5–6 mm. longis 2–3 mm. latis concavis basin florum amplexantibus apice longe acuminato-cuspidatis glabris. Segmenta toto conniventia toto alba. Sepala trinervia; posticum lineare 5 mm. longum $1\frac{1}{3}$ mm. latum apice obtusum basi haud contractum glabrum; lateralibus quam postico angustiora apice acuminato-obtusa 5 mm. longa 1 mm. lata. Petala quam sepalum tenuiora 5 mm. longa 1 mm. lata apice obtusissima 1–nervia. Labellum in ambitu oblongum 4–5 mm. longum $2\frac{1}{2}$ mm. latum apice obtusissimum basi erectum concavum columnam amplexans apice patens margine basi usque ad medium integrum medio sursum valde crispatum erosum ad paginam medio sursum breve crispato-hirsutum basi leviter gibbosum, gibbis intus protuberantibus duobus instructis. Columna 1 mm. longa.

HAB. Suisha, ad 2500 ped. alt., leg. B. HAYATA, Aprili. 1916.

This differs from the common *Spiranthes australis* by the perfectly white flowers with 2 rounded protuberances at the base of the lips. The protuberances are in *S. australis* are hooked and bent downwards.

***Physurus* RICH.**

***Physurus chinensis* ROLFE; MATSUM. et HAYATA Enum. Pl. Formos. p. 409.**

HAB. Karapin, leg. B. HAYATA, Mart. 1914. Note:—Flowers light ashy-purple or nearly white.

***Galeola* LOUR.**

***Galeola ochobiensis* HAYATA sp. nov. (Fig. 19).** Fulvescens ad truncos repens, radicibus numerosis incrassatis, radicibus aëriis oppositi-ramis teretibus in nostro specimine 3–4 cm. longis.

Caulis glaber teres ad nodos 1-squamatus, squamis ovatis obtusis ramos semi-amplectantibus 1–2 cm. longis. Racemi paniculato-ramosi, ramis 3–5 cm. longis, bracteis ovatis acutis 3 mm. longis persistentibus, pedicellis cum ovariis 4–5 mm. longis glabris. Flores pallido-lacteo-rubescentes glabri. Sepala

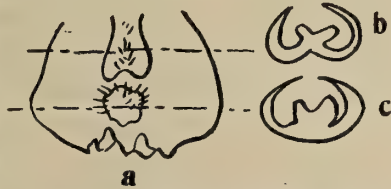


Fig. 19, *Galeola ochobiensis* HAYATA; a, a lip, expanded; b, c, sections of the same lip, which is not unfolded.

conniventia demum plus minus patentia, posticum oblongo-lineare 12 mm. longum 3 mm. latum glabrum apice obtusum, lateralia quam postico latiora 4 mm. longa apice obtusissima basi haud contracta. Petala angusta linearia et spathulata 12 mm. longa 2 mm. lata apice obtusissima vel rotundata basi attenuata. Labellum ad basin columnæ sessile latum concavum columnam laxè involvens sepalis æquilongum 10 mm. longum in explicato 10 mm. latum obscure 3-lobatum, lobis lateralibus latissimis transverse venulosis, lobo medio minuto undulato-crispo facie villosa callis duobus instructo, callo superiore subrotundato villosa, callo inferiore minus villosa. Columna 7 mm. longa exalata apoda. Capsula linearis cylindrica pendula 16 cm. longa 5 mm. lata.

HAB. Ōchōbi, leg. B. HAYATA, Mai. 14, 1916.

Found climbing on a tree in forests on a cliff at the sea-coast. Near *G. altissima* REICH. f.; but differs from it in having differently shaped lips.

Vanilla Sw.

Vanilla Somai HAYATA sp. nov. (Pl. XIV.). Epiphytica. Caulis ramosus scandens glaber teres viridis flexuosus. Folia alterna oblongo-lanceolata 17 cm. longa $5\frac{1}{2}$ cm. lata apice acuminata ad summum obtusa basi contracta rotundata vel truncata margine integra coriacea plana utraque glabra, nervis in exsiccatu utraque elevatis 25–30 parallelis, petiolis 1 cm. longis dilatatis semi-amplexicaulibus. Racemi quasiterminales 2–3 cm. longi sessiles; rhachibus flexuosis multifloratis sed abortu 1–2-floratis, bracteis oblongo-triangularibus membranaceis $1-1\frac{1}{2}$ cm. longis naviculiformibus plicatis glabris apice obtusis vel acutis divaricatis, pedicellis cum ovariis 3–4 cm. longis gracilibus 2–3 mm. latis glabris. Flores 4 cm. longi pallido-virides; sepalum posticum oblanceolatum 4 cm. longum 1 cm. latum apice abrupte acutum ad summum obtusum basi attenuatum glabrum, lateralia plus minus obliqua quam posticum angustiora. Petala lineari-oblanceolata 4 cm. longa 5 mm. lata apice abrupte acuminata basi gradatim attenuata. Labellum pallido-viride extus sursum leviter roseum 4 cm. longum tubuloso-infundibuliforme in explicato obtriangulare 3-lobatum margine crenulatum (lobo medio minuto deorsum subito recurvo viridi) medio fasciculo pilorum 5 mm. longo 3 mm. lato instructum apice viridissimum pilis brevibus conspersum, medio lineis miniatis 2 cm. longis recurvis utroque latere sitis. Columna 3 mm. longa.

HAB. Remogan, leg. B. HAYATA et T. SÔMA, Mai. 1916.

Near *Vanila Griffithii* var. *formosana*; but differs from it in having pale green cream-colored lips.

Vrydagzynia BLUME.

Vrydagzynia formosana HAYATA sp. nov. Caulis basi repens ad nodos radicans sursum ascendens suberectus, partibus erectis circ. 10 cm. longis teretibus foliatis glabris. Folia glabra alterna versus apicem caulis fere approximativim disposita, lamina oblonga $2\frac{1}{2}$ – $3\frac{1}{2}$ cm. longa $1\frac{1}{2}$ cm. lata apice acuta ad summum acutissima basi obtusa vel rotundata subito ad petiolum cum vaginis 1 cm. longum abeunti, petiolis basi vaginiformibus, vaginis 5 mm. longis $2\frac{1}{2}$ mm. latis. Racemi terminales solitarii cum pedunculis 5 cm. longi, pedunculis $2\frac{1}{2}$ cm. longis hirsutis, bracteis ovato-lanceolatis apice obtusis basi vix contractis extus hirsutis intus glabris margine ciliolatis valde concavis alabastrum

floris amplexantibus, pedicellis (=ovariis sessilibus) 6 mm. longis 1 mm. latis hirsutis. Segmenta conniventia extus sparse hirsuta intus glabra sursum albicantia deorsum viridescantia. Sepalum posticum lineari-lanceolatum 6 mm. longum 2 mm. latum apice obtusissimum leviter dilatatum basi vix contractum cum petalis galeam formantia. Sepala lateralia obliqua $5\frac{1}{2}$ mm. longa $2\frac{1}{2}$ mm. lata apice obtusa basi valde obliqua latere inferiore auriculato-cordata latere superiore acute ovato-oblonga. Petala oblique ovato-lanceolata $4\frac{1}{2}$ mm. longa 2 mm. lata apice attenuata ad summum perfecte truncata ad summum $\frac{1}{2}$ mm. lata basi contracta 1-nervia. Labellum erectum oblongum apice obtusissimum medio callo uno crassiusculo notatum, basi ad calcar latissimum 4 mm. longum 2 mm. latum productum. Columna brevis $1\frac{1}{2}$ mm. longa crassiuscula anteriore apice 2-cornuta, cornibus (stigmatosis) $\frac{1}{2}$ mm. longis obtusissimis; anthera rotundata $1\frac{1}{2}$ mm. longa totiusque lata. Rostellum triangulare $1\frac{1}{2}$ mm. longum. Calcar intus callis 2 longe stipitatis a columnæ basi descendentibus instructum.

HAB. Inter Urai et Agioku, leg. B. HAYATA, Mai. 1916.

Near *V. gracilis* BLUME.

Zeuxine LINDL.

Zeuxine tabiyahanensis HAYATA sp. nov. = *Adenostylis tabiyahanensis* HAYATA. Terrestris. Caulis basi repens ad nodos radicer, partibus ascendentibus 20 cm. longis erectis usque ad medium foliiferis simplicibus, apice ad racemum abeuntibus deorsum glabris sursum hirsutis. Folia plus minus obliqua vel æqualia oblonga vel elongato-oblonga 5-7 cm. longa $2\frac{1}{2}$ cm. lata apice acuta ad summum acutissima basi acuta subito ad petiolum 1 cm. longum abeuntia margine integra chartacea vel membranacea utraque pagine glabra, nervis lateralibus utroque latere costæ 1, venis inter costam et nervos laterales 3-4, petiolis basi vaginatis cum vaginis $2\frac{1}{2}$ cm. longis, vaginis 1- $1\frac{1}{2}$ cm. longis $\frac{1}{2}$ cm. latis, ore obliquo. Racemi simplices terminales 6 cm. longi laxè floriferi hirsuti, bracteis lanceolatis $1\frac{1}{2}$ cm. longis 4 mm. longis plus minus hirsutis. Ovarium oblique cylindricum utroque constrictum 1 cm. longum hirsutum. Sepala suberecta extus hirsuta intus glabra; posticum oblongum 1 cm. longum 7 mm. latum apice triangulari-acutum ad summum obtusum basi haud contractum ad summum obtusum valde concavum cum petalis galeam formans 3-nervium; lateralia elongato-oblonga postico æquilonga 4 mm. lata apice

obtusissima basi leviter contracta 3-nervia integra plus minus obliqua. Petala glabra cultriformia vel semi-obovata 1 cm. longa 4 mm. lata apice obtusa basi attenuata margine interiore subrecta margine exteriori curva, margine exteriori prope apicem crenulata 2-nervia. Labellum basi cum alis columnæ connatum erectum basi (hypochilo) saccato-concavum, hypochilo 5 mm. longo 3-nervio ad nervos laterales fimbriis instructo, medio (mesochilo) angustato 2 mm. longo sulcato basi auriculis instructo; lamina, (epichilo) 2-lobata, lobis divaricatis late obtriangularibus 4 mm. longis apice fere truncatis latissimis 5 mm. latis basi 2 mm. latis apice dentato-erosis latere integris duobus se angulo 180° egressis utraque pagine breve hirsutis. Columna brevis 2 mm. lata 2 mm. longa facie anteriore 2-alata apice 2-cornuta, cornibus membranaceis deorsum \odot -formiter recurvatis 2 mm. longis; rostellum longe 2-fidum, segmentis linearibus $2\frac{1}{2}$ mm. longis; anthera elongata triangularis 3 mm. longa $1\frac{1}{2}$ mm. lata apice acuta basi sagittata; stigmata 2 utroque latere basis rostellii disposita sessilia.

HAB. Tabiyahanzan, leg. B. HAYATA, Mai. 1916.

The present species approaches to *Cheirostylis*, *Zeuxine Odontochilus* and *Anæctochilus*, but is not referable to neither. The new orchid is different from *Cheirostylis* in having distinct sepals and petals, from *Zeuxine* and *Odontochilus* in the lateral arms of the columns, and from *Anæctochilus* by not having distinct spurs. As the specimen is wanting pollinia, it is quite uncertain as to its proper genus.

***Myrmechis* BLUME.**

Myrmechis drymoglossifolia

HAYATA sp. nov. (Fig. 20). Terrestriis basi procumbens ad nodos radicans, partibus erectis 4-7 cm. longis. Caulis teres glaber vel subglaber. Folia alterna petiolata rotundato-ovata 6-7 mm. longa 5-6 mm. lata apice triangulariobtusata basi rotundato-truncata margine integra vel crispato-repandulata



Fig. 20, *Myrmechis arisanensis* HAYATA.

3-nervia, nervis tenuissimis, utraque glaberrima, petiolis cum vaginis 3-4 mm. longis dorso complanatis basi vaginatis, vaginis 1-2 mm. longis 1-1½ mm. latis obconiciformibus glabris semi-hyalinis membranaceis ore obliquis. Flores terminales solitarii pedunculati, pedunculo (ovario excepto) 6 mm. longo basi apiceque bracteato hirsuto; bractea inferiore basi vaginata, vagina tubiformi 1-2 mm. longa ore ciliata, lamina ovata circ. 2 mm. longa glabra; bractea superiore ovata 4 mm. longa ovarium amplexantia hyalina margine retrose ciliata; ovario ovato-lineari 4-5 mm. longo glabro 1½ mm. lato. Sepala et petala basi usque ad medium conniventia ovato-linearia 6 mm. longa apice attenuata conniventia tubum 3-4 mm. latum formantia toto glabra. Labellum Y-forme: hypochilo cum tubo perianthii conniventi; mesochilo libero lineari 2 mm. longo 1 mm. lato, lamina (epichilo) V-forme bipartita, partibus divaricatis linearibus 2 mm. longis 1 mm. latis. Columna nulla; anthera dorsalis ovata 1½ mm. longa apice attenuata; pollinia 2 sectilia; stigma ignotum.

HAB. Arisan, 8000 ped. alt., leg. U. FAURIE, Juni. 1914, (No. 929).

Near *Myrmechis gracilis* BL. and *M. japonica* ROLFE; but differs from them in having much smaller leaves.

***Goodyera* R. BR.**

Goodyera arisanensis HAYATA sp. nov. Caulis cum spicis 25 cm. longus glaber basi 5-6-foliatus erectus apice ad spicam abeuns sursum squamis 8-9 remote instructus. Folia oblonga vel ovato-oblonga 4 cm. longa 1½ cm. lata apice acuta vel breve acuminata basi acuta margine integra chartacea vel crasse membranacea utraque pagine glabra, petiolis 2 cm. longis dilatatis basi vaginatis, vaginis ½ cm. longis hyalinis, ore obliquo. Spicæ terminales simplices 11 cm. longæ densiuscule floratæ, bracteis lanceolatis post anthesin auctis 3 mm. longis acuminatis ovario æquilongis. Ovarium ovoideo-fusiforme 3 mm. longum glabrum. Segmenta conniventia 3 mm. longa. Sepalum posticum ovato-lanceolatum 3 mm. longum 1 mm. latum glabrum 1-nervium, nervo manifesto, glabrum cum petalis galeam formans basi plus minus contractum; lateralia oblique lanceolato-oblonga 3½ mm. longa 1¼ mm. lata postico latiora glabra manifeste 1-nervia apice obtusa vel acuta basi haud contracta. Petala lineari-lanceolata 3½ mm. longa ⅔ mm. lata apice obtusa basi angustata tenuiter mem-

branacea 1-nervia. Labellum subsaccatum subrectum haud recurvum $2\frac{1}{2}$ mm. longum $1\frac{1}{2}$ mm. profundum extus glabrum apice triangulari-acutum, sacco apice rotundato intus glabro lineis callosis cristatis duabus instructo. Columna brevissima $\frac{1}{2}$ mm. longa; rostellum membranaceum aristato-2-fidum. Capsula ellipsoidea 7 mm. longa 4 mm. lata utrinque valde constricta glabra vel sparsissime hirsuta. Anthera ovata 1 mm. longa apice 1-aristata.

HAB. Mt. Arisan, ad 2500 m. alt.; leg. U. FAURIE, Dec. 1914.

Near *Goodyera nantensis* HAYATA, but differs from it in having larger flowers and leaves with different venation.

Goodyera cyrtoglossa HAYATA Ic. Pl. Formos. p. 113.

HAB. Rōsnikei, leg. B. HAYATA, Aprili. 1916. Note:—Some of the flowers are upside down; rhachis purple-red; segments pale-ochraceous, column green, lip white.

Goodyera longicolumna HAYATA sp. nov. Caulis teres basi procumbens ad nodos 3 cm. se remotos 5 mm. crassos radices 2-3 emittens, radicibus teretibus incrassatis, basi sursum ascendens, parte ascendenti cum spicis 30 cm. longa simplici a basi usque ad medium foliosa erecta sursum ad spicam simplicem 7 cm. longam abeanti deorsum glabra sursum minute hirsuta. Folia 9-10 oblonga vel elliptica membranacea glaberrima 9-10 cm. longa $4\frac{1}{2}$ cm. lata apice breve cuspidato-acuminata vel acuta ad summum obtusa basi obtusa subito cuneatim ad petiolum abeuntia margine integra, nervis lateralibus 5-6 utroque latere costæ, petiolis circ. 6 cm. longis gracilibus basi subito dilatatis subvaginatis caulem amplectantibus. Spicæ (vel racemi) simplices circ. 10 cm. longæ erectæ dense vel densiuscule floriferæ, bracteis lanceolatis hirsutis margine aristato-ciliolatis $1\frac{1}{2}$ cm. longis acuminatis ascendentibus. Ovarium lineare 7 mm. longum breve hirsutum. Segmenta extus toto hirsuta. Sepalum posticum oblongo-lanceolatum 8 mm. longum 3 mm. latum apice obtusissimum basi vix vel haud contractum cum petalis galeam formans manifeste 1-nervium, lateralia postico æquilonga fere æquiformia apice obtusa. Petala oblanceolato-spathulata 8 mm. longa 2 mm. lata apice obtusissima basi gradatim attenuata tenuissime membranacea manifeste 1-nervia. Labellum saccatum 7 mm. longum 4 mm. latum apice triangulari-acutum ad summum obtusum, sacco intus hirsuto. Columna cum rostello 5 mm. longa $1\frac{1}{2}$ mm. lata, rostello 2-lobo, lobis acutis.

Anthera ovata 3 mm. longa apice acuminata.

HAB. Urai, leg. S. SASAKI, Aprili. 1910.

Remarkable for the rostellum which is much longer than that of any other species of the genus in the island.

Gastrodia R. BR.

Gastrodia dioscoreirhiza HAYATA sp. nov. Terrestis aphylla. Tuber longissimum cylindricum vermiforme recurvum haud radiciferum 20–30 cm. longum 10–20 cm. in diametro rugosissimum squamis tenuissimis hyalinis sparse obtectum apice ad scapum abeuns. Scapi complanati fulvo-rubescens hac atque illac vaginis brevibus instructi. Rhachis florifera 3–4 cm. longa glabra, bracteis oblongis 3 mm. longis 2 mm. latis apice obtusis valde concavis glabris, pedicellis erectis glabris ovario excepto 4 mm. longis, ovariis obconico-cylindricis apice haud contractis 2 mm. latis 2 mm. longis basi attenuatis. Sepala cum petalis connata tubum formantia fulvo-rubescens, tubo circ. 1 cm. longo 4 mm. lato 5-lobato, lobis exterioribus (sepalis) 1–2 mm. longis semi-clausis valde concavis intus lævibus extus tuberculatis, lobis interioribus (petalis) rotundatis $1\frac{1}{2}$ –2 mm. longis lævibus $1\frac{1}{2}$ mm. latis basi contractis. Labellum..... Columna elongata triquetra ad angulos manifeste alata.

HAB. Giranchō : Soseikyaku, leg. B. HAYATA, 12, Mai. 1916.

Very remarkable for its long cylindrical tubers.

Platanthera RICH.

Platanthera stenoglossa HAYATA Ic. Pl. Formos. IV. p. 123.

HAB. Rankanzan, leg. B. HAYATA ad 4000 ped. alt., Mai. 1916.

Note:—Rhachis and sepals pale green; petals and lips pale yellow.

Gymnadenia R. BR.

Gymnadenia Tominagai HAYATA sp. nov. Terrestis. Caulis simplex 8–10 cm. longus erectus subrectus gracillimus supra basin 2-foliatus apice 1–2-floratus. Folia alterna oblanceolata 4 cm. longa $3\frac{1}{2}$ mm. lata apice acuta basi gradatim attenuata erecta membranacea integra. Flores 1–2 terminales vel laterales, bracteis lanceolatis 1 cm. longis 3 mm. latis apice acuminatis glabris. Ovarium sessile ovoideo-cylindricum 7 mm. longum glabrum. Sepala inæqualia; posticum erectum intus concavum oblongum 6 mm. longum apice obtusum basi plus minus contractum glabrum 3-nerviū, lateralia quam

posticum majora 7-8 mm. longa 4 mm. lata basi obliquissima basi latere inferiore rotundata. Petala ovato-oblongo-triangularia 6 mm. longa 3 mm. lata apice triangulari-acuta vel obtusa dorso apice plus minus carinata basi valde obliqua latere inferiore auriculato-rotundata basi latere superiore rotundata basi plus minus brevissime unguiculata. Labellum ad basin columnæ adnatum sessile anteriore expansum secus longitudinem deorsum leviter plicatum, lamina in ambitu obtriangulari 1 cm. longa totiusque lata medio 3-lobata, lobis laterilibus triangularibus lobo centrali æquilongis a lobo centrali angulo 45° egressis apice acutis, lobo centrali rectangulariformi 3-4 mm. longo 3 mm. lato apice 3-cuspidato, tota pagine tuberculatum, tuberculis acutis minutissimis, basi calcaratum, calcare infundibuli-tubuliformi $5\frac{1}{2}$ mm. longo 1 mm. lato apice acuto. Columna brevissima $1\frac{1}{2}$ mm. longa.

HAB. Nantōchō: Gundaizan, leg. T. TOMINAGA, Aug. 1916.

Near *Gymnadenia lepida* REICHB. fil., but separable from it by the much narrower erect leaves.

Habenaria WILLD.

Habenaria Miersiana CHAMP.; MATSUM. et HAYATA Enum. Pl. Formos. p. 419.

HAB. Shakkō, leg. U. FAURIE, (No., 951) Sept. 1914.

Hæmodoraceæ.

Peliosanthes ANDR.

Peliosanthes arisanensis HAYATA sp. nov. (Pl. XV.) Rhizoma nodosissimum repens 5 mm. crassum recurvum dense radicans, radicibus incrassatis $1\frac{1}{2}$ -2 mm. crassis. Folia singulariter disposita haud fasciculata longe petiolata oblanceolata chartaceo-membranacea 23-25 cm. longa 5-6 cm. lata apice acuminata basi gradatim recto-attenuata ad petiolum abeuntia margine integra sub microscopio minutissime serrulata utraque pagine glabra multi-nervia, venulis tessellatis, in specimine exsiccato nervis venis venulis tessellatisque totis elevatis distinctis, petiolis 25-26 cm. longis subteretibus glabris toto nudis haud squamatis. Scapi cfoliati esquamati perfecte nudi 30-35 cm. longi (cum racemis) erecti recti glabri subteretes apice racemosi; racemi circ. 10 cm. longi laxiuscule florati, floribus tortu subsecunde dispositis basi bractcatis, bracteis

linearibus 1–2 cm. longis 2–3 mm. latis apice acuminatis basi latissimis dorso extus 3-nerviis leviter 3-carinatis valde concavis naviculiformibus descendentes apice ascendent-recurvis. Flores nutantes supra-axillares, ex altitudine 1 mm. supra axillas bractearum oriundi pedicellati, pedicellis glabris recto-descendentibus 3 mm. longis apice cum flore articulatis basi latere inter bracteam et pedicellum bracteola singula instructis, bracteolis glabris triangulari-lanceolatis 4 mm. longis intus concavis subplicatis naviculiformibus extus a basi usque ad apicem prominente carinatis apice interiore recurvis descendentes. Perianthium obconicum circ. 8 mm. longum 6-lobatum, tubo obconico 4 mm. longo 7 mm. lato glabro, lobis 3 exterioribus oblongo-triangularibus 6 mm. longis 4 mm. latis apice triangulari-obtusis basi leviter contractis utraque glaberrimis crassiusculis suberectis, lobis 3 interioribus æquilongis sed minus latis. Corolla secundaria e basi loborum perianthii oriunda erecta late tubosa 3 mm. longa 6 mm. lata crassissima extus intusque brevissime hirsuta apice plus minus contracta ore semi-clausa brevissime latissime 6-dentata vel subintegra intus infra apicem antherifera, antheris sessilibus rotundato-oblongis $\frac{3}{4}$ longis $\frac{2}{3}$ mm. latis apice emarginatis basi 2-lobatis interiore dehiscentibus. Ovarium 5 mm. longum cum tubo perianthii ad 2 mm. altitudinem connatum sursum 3 mm. liberum (parte libera late coniciformi) brevissime densissime pilosum apice triangulari-acutum ad stylum glabrum brevem 1 mm. longum crassiusculum abeuns, deorsum 3-loculare sursum 1-loculare ovulis e basi loculorum oriundis linearibus 2 mm. longis $\frac{1}{3}$ mm. latis erectis in loculo singulo 2–3. Styli apice clavati ad summum leviter 3-lobati, stigmatibus ad summum styli Y -forme dispositis. Bacca globosa 1-sperma. Semina globosa 7 mm. in diametro, testa? crassissima spongiosa? Embryo linearis centralis 4–5 mm. longus 1 mm. latus subteres vel plus minus complanatus. *Peliosanthes courtallensis* HAYATA Fl. Mont. Formos. p. 225 (non WIGHT).

HAB. Mt. Arisan, prope Karapin, leg. B. HAYATA et S. SASAKI, Jan. 1912; leg. G. NAKAHARA.

Near *Peliosanthes courtallensis*, but differs from it in the much smaller flowers.

Peliosanthes Tashiroi HAYATA sp. nov. Rhizoma repens, radicibus incrassatis. Folia singulariter sita longe petiolata elongato-oblonga vel lanceolata circ. 20 cm. longa 3–7 cm. lata apice acuminata basi attenuata gradatim ad petiolum abeuntia margine integra sed sub microscopio minutissime serrulata chartaceo-membranacea utraque pagine glabra, nervis venis venulis tessellatisque utraque pagine in exsiccato distincte visis, petiolis basi nudis haud squamatis glabris subteretibus 24–25 cm. longis laminam foliorum in longitudine superantibus. Scapi cum racemis 12–22 cm. longi erecti glabri haud foliatis haud squamati glabri. Racemi 15–10 cm. longi glabri laxiuscule floriferi tortu subsecunde dispositis. Flores subnutantes, bracteis et bracteolis ut in *P. arisanensis*, sed quam iis minoribus vel interdum bracteolis medio pedicellis, pedicellis 4 mm. longis descendentibus glabris cum perianthio articulatis. Perianthium 5-lobatum late campanulatum $1\frac{1}{2}$ cm. latum extus glabrum, tubo late campanulato 2 mm. longo $4\frac{1}{2}$ –5 mm. lato glabro, lobis 5 triangulari-oblongis 5–6 mm. longis 4 mm. latis apice obtusis basi plus minus contractis margine integris sed minute ciliolatis vel haud ciliolatis extus glabris intus brevissime hirsutis. Corolla secundaria 2 mm. longa semi-globosa 5 mm. lata extus brevissime densissime hirsuta apice ore semi-clausa contracta 5-lobata, (lobis brevissimis late triangularibus 1 mm. latis $\frac{1}{4}$ mm. longis late acutis) intus hirsuta infra apicem loborum intus antherifera. Stamina 5, antheris sessilibus rotundato-ovatis $\frac{4}{5}$ mm. longis $\frac{3}{5}$ mm. latis apice emarginatis basi 2-lobatis interiore dehiscentibus. Ovarium sublibebrum fere superum basi leviter cum tubo perianthii connatum conicum brevissime dense hirsutum 2 mm. longum $2\frac{1}{2}$ mm. latum basi latissimum sursum attenuatum apice ad stylum brevissimum glabrum 1 mm. longum apice stigmatiferum abeuns, ovulis a basi loculi oriundis paucis erectis. Bacca ellipsoidea, 1-sperma. Semina 7 mm. longa 6 mm. lata ellipsoidea, testa crassissima spongiosa?

HAB. Taihoku cult.: leg. Y. TASHIRO, Feb. 1912.

Near *P. arisanensis* HAYATA, but separable from it by the pentamerous flowers.

Liliaceæ.

Heterosmilax KUNTH.

Heterosmilax arisanensis HAYATA Ic. Pl. Formos. V. p. 235, descriptio aucta: Perianthium floris ♀ ovoideo-fusifforme 4 mm. longum 3 mm. latum glabrum apice leviter trilobatum, lobis triangularibus $\frac{1}{2}$ mm. longis obtusis semi-clausis glabris. Staminodia 3 linearia $2\frac{1}{2}$ mm. longa $\frac{1}{4}$ mm. lata complanata glabra. Ovarium ovoideum cum stylo brevissimo $2\frac{1}{2}$ mm. longum $1\frac{3}{8}$ mm. latum glabrum apice stylo conico $\frac{1}{3}$ mm. longo apiculatum, stylo apice acuto obscure 3-lobato, stigmate inconspicuo; ovarium 3-loculare, loculis 2-ovulatis.

HAB. Arisan, 2500 m., leg. U. FAURIE, Jun. 1914, (No. 309).

Rohdea ROTH.

Rohdea Watanabei HAYATA (XVI.) Ic. Pl. Formos. V. p. 236.

Lilium LINN.

Lilium Kanashiroi HAYATA sp. nov. Caulis simplex gracilis erectus 30 cm. longus teres $1\frac{1}{2}$ mm. in diametro sectionis glaber toto foliifer. Folia linearia lineari-lanceolata 6 cm. longa 2 mm. lata apice acuta vel obtusa basi deorsum attenuata ad basin subito dilatata sessilia chartacea, costa supra tenuiter impressa subtus tenuiter elevata. Flores ad apicem caulis solitarii terminales et generaliter cernui flavi. Segmenta (perianthii) a medio sursum retrorse reflexa patentia flava, exteriora 3 ☉-forme reflexa lineari-spathulata cum unguibus 4 cm. longa deorsum unguiformia, unguibus $1\frac{1}{2}$ cm. longis 3 mm. latis erectis margine interiore recurvis extus lævibus intus deorsum 2-striatim hirsutis, laminis linearibus $2\frac{1}{2}$ cm. longis 6 mm. latis planis exteriori recurvis margine integra planis apice obtusis pilis claviformibus dense obtectis infra apicem extus callis singulis instructis intus infra apicem leviter concavis utraque pagine glabris haud costatis, nervulis parallelis undulatis; 3-interiora cum unguibus spathulata 4 cm. longa, unguibus $1\frac{1}{2}$ cm. longis apice gradatim ad laminam abeuntibus intus 2-striatim hirsutis extus glabris] carinatis carinis ad laminam abeuntibus, lamina lineari $2\frac{1}{2}$ cm. longa 8 mm. lata apice emarginata vel breve 2-lobata apice in ambtu truncata margine integra sursum minute ciliolata sursum pilosiuscula, extus medio

prominente carinata intus haud carinata. Stamina 6, filamentis linearibus 22 mm. longis 1 mm. latis 1-nervatis complanatis apice subulato-acuminatis glabris, antheris flavis 8 mm. longis $1\frac{1}{2}$ mm. latis utrinque emarginatis versatilibus. Ovarium cylindricum 14 mm. longum 2 mm. latum apice 6-lobulatum glabrum, stylo columnari 1 cm. longo glabro acute triquetro apice plus minus dilatato, stigmate 2-fido, segmentis patentibus semi-rotundatis 3 mm. longisque latis apice obtusis.

HAB. Loo-choo, leg. S. KANASHIRO, No. 340, fl. flavo.

The present lily was previously identified with the Japanese *L. callosum* S. et Z. The latter is however limited to the southern part of Japan, while this new species is found only in the Loo-choo islands. The difference between the two species is, besides many others, observed in the color of the flowers. The perianth of *L. callosum* is reddish, while *L. Kanashiroi* is yellowish. The callosities at the apex of the leaves of the former can never be seen in the latter.

Lilium talanense HAYATA sp. nov. (Fig. 21). Pseudobulbi depresso-ovati vel depresso-rotundati $2\frac{1}{2}$ cm. longi 3 cm. lati, squamis carnis ovatis apice abrupte acutis, radicibus fibrosis e basi pseudobulbi oriundis. Caulis 20-30 cm. longus erectus rectus gracilis 2 mm. in diametro a basi usque ad medium foliifer. Folia linearia 5 mm. longa apice acuminata basi latissima 2-3 mm. lata glabra, costa supra impressa subtus tenuiter elevata, sessilia, superiora minora squamiformia. Flores ad apicem caulis terminales suberecti solitarii, interdum floribus 1-2 racemosum dispositis, pedunculis bracteis minoribus 2-3 remote alternatimque instructis, bracteis linearibus 5 mm. longis 1 mm. latis apice truncatis interiore recurvis callosis. Flores rubescentes 3 cm. in diametro. Segmenta, exteriora 3 lineari-spathulata $4\frac{1}{2}$ cm. longa 6 mm. lata, apice calloso-obtusa concava plus minus cristata basi unguiforme attenuata utraque glabra, interiora paullo latiora 8 mm. lata apice obtusa haud cristata dorso prominente distincteque carinata basi unguiculata attenuata. Stamina 6, filamentis filiformibus complanatis 1-nerviis glabris $2\frac{1}{2}$ cm. longis apice subulatis pallido-rubris, antheris rubris versatilibus linearibus 7 mm. longis. Ovarium clavato-prismatico-cylindricum 17 mm. longum 3 mm. latum apice truncatum basi attenuatum viride glabrum, stylo columnari 10 mm. longo clavato-triquestro



Fig. 21, *Lilium talanense* HAYATA.
(After a water-colour drawing by Mrs. T. KAWAKAMI.)

glabro, stigmatē terminali globoso 3–4 mm. lato basi 3-lobato fulvo.

HAB. Shintikuchō: Talang, Taiheitō, ad 1900 ped. alt., leg. S. YAMADA, Aug. 1914.

Near *Lilium callosum* S. et Z., but differs from it in the perianth-segments which are scarlet on the upper surface but light red on the back. The segments of *L. callosum* are usually purple on the back.

Juncaceæ.

Juncus LINN.

Juncus leptocladus HAYATA sp. nov. Annuā. Caulis tenuissimus glaber scandentissimus ramosissimus 26 cm. longus subteres gracillimus. Folia radicalia linearia circ. 12 cm. longa 1 mm. lata apice acuminata basi plus minus vaginata dorso complanata glaberrima margine interiore tenuissime recurva erecta tenuissima herbacea, vaginis 2–3 cm. longis latere uno fissis margine membranaceis. Flores laxissime cymosi breve vel longe pedicellati basi bracteis 2 instructi, bracteis triangulari-ovatis apice acutis hyalinis 2 mm. longis $1\frac{1}{2}$ mm. latis glabris haud costatis haud nervosis. Perianthii segmenta exteriora 3 lanceolato-linearia $6\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata apice acuminata glabra late 1-costata margine hyalina, segmenta interiora lineari-lanceolata 4 mm. longa $\frac{2}{3}$ mm. lata apice acuminata late 1-costata margine hyalina glabra. Stamina 6, filamentis filiformibus 1 mm. longis glabris basi se brevissime connatis, antheris linearibus 1 mm. longis $\frac{2}{10}$ mm. latis utrinque obtusis. Ovarium glabrum lineari-ovoideum circ. 1 mm. longum $\frac{1}{3}$ mm. latum apice ad stylum $\frac{1}{2}$ mm. longum abeuns tri-sulcatum trigonum, stigmatibus 3-fidis.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

Somewhat near *Juncus bufonius* LINN., but widely different from it in having far much longer perianth.

Aroideæ.

Arisæma MART.

Arisæma arisanensis HAYATA sp. nov. Tuber depresso-globosum 2 cm. longum 3 cm. latum, radicibus a facie superiore tuberis oriundis teretibus. Caulis cum spadice 30 cm. longus glaber basi 13 mm. latus 1–2-vaginis instructus

2-foliatus. Folia 2 subopposita basi vaginata longe petiolata, petiolis vagina excepta 15 cm. longis glabris teretibus erectis, lamina tripartita 3-foliolata, foliolis sessilibus, foliolo terminali ovato-lanceolato 12 cm longo 4 cm. lato apice recto-acuminato (acumine lineari versus apicem filiformi, partibus filiformibus 1½ cm. longis) basi subito cuneato margine subintegro membranaceo utraque pagine pubescenti, venis lateralibus tenuissimis, foliolis lateralibus foliolo terminali æquilongis æquilatis sed valde obliquis latere inferiore basi rotundatis vel obtusissimis latere superiore basi acuminatis sessilibus. Spadix terminalis, pedunculo 6 cm. longo 3-4 mm. lato apice gradatim dilatato ad spatham abeunti. Spatha clavato-cylindrica 9-10 cm. longa, tubo 5 cm. longo 2 cm. lato latere uno fisso, limbo saccato-fornicato verticaliter late multi-striato, striis viridibus 2-3 mm. latis, tenuiter pubescenti. Spadix ♂ columniformis 6 cm. longus basi florifer; partibus floriferis cylindricis 13 mm. longis 6 mm. latis densiuscule floriferis; appendice 4½ cm. longa basi cylindrica, partibus inferioribus appendicis cylindricis 6-7 mm. longis 4 mm. latis, partibus supra partem cylindricam subito dilatatis 8 mm. latis sursum gradatim angustioribus apice obtusis. Fl. ♂: stamen 1, subsessile; anthera 2-locularis, loculis globosis approximatis ½ mm. in diametro.

HAB. Arisan, 2500 m. alt., leg. U. FAURIE, Junio. 1914.

Resembles *Arisæma ringens* in having trifoliolate leaves and fornicate spathas, and in the spadix; but distinguishable from it in having much smaller hairy leaflets with a filiformed tip and in the spadix which is more or less attenuate towards the apex.

Amorphophallus BLUME.

Amorphophallus (*Candarum*) **gigantiflorus** HAYATA sp. nov. (Fig. 22). Bulbus depresso-globosus vel semi-globosus 15 cm. longus 22 cm. latus basi rotundatus apice latissimus ad centrum valde depressus e centro scapum emittens facie cicatricibus radices tuberculatus, radicibus incrassato-filiformibus 20-30 cm. longis 2½ mm. in diametro simplicibus haud ramosis. Scapus cum spadice circ. 45 cm. longus e centro summi bulbi oriundus spadice excepto 7 cm. longus 3½ cm. crassus rugosus basi bracteis duabus involutus, bractea inferiore triangulari-oblonga 20 cm. longa 10 cm. lata apice obtusa vel apiculata coriacea minute-nervosa intus concava margine interiore recurvata basin

scapi amplexant, bractea superiore longiore 31 cm. longa 12 cm. lata obovato-oblonga basin scapi amplexant intus concava minute nervosa. Spatha in statu obconico-campulata 30 cm. longa sursum 40 cm. in diametro, latere uno fissa spadice sinestro obtegens in explicato fere rotundata 40-50 cm. in diametro apice obscure triangulari-obtusa margine plicato-undulata, exta glabra lævis purpureo-viridescens albo-maculata (maculis rotundatis 6 mm. in diametro) usque ad prope 18 cm. altitudinem plus purpurea versus apicem plus viridescens, intus prope marginem lævis, partibus infra-marginalibus 7 cm. latis intus rugulosis viridescens,

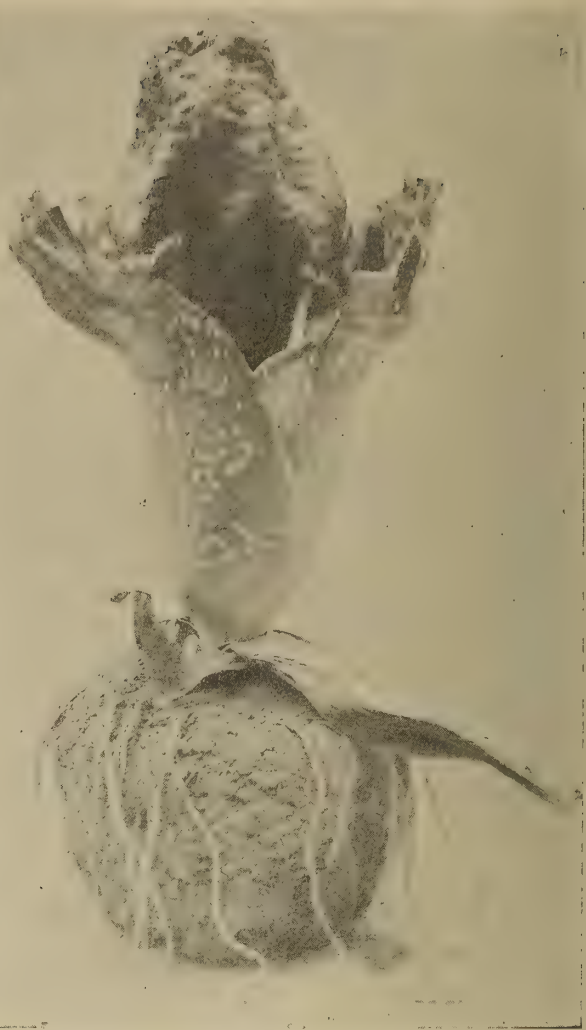


Fig. 22, *Amorphophallus gigantiflorus* HAYATA.

partibus mediis 7 cm. latis intus lævibus albis, partibus inferioribus intus a basi usque ad 12 cm. altitudinem atro-purpureis densissime verrucoso-tuberculatis, (tuberculis setuloso-coniformibus circ. 2 mm. longis fulvis), prope latere uno lævis. Spadix in ambitu claviformis 38 cm. latus sessilis, partibus ovariiferis inferioribus 13 cm. longis cum pistilis 8 cm. latis cylindricis ovario excepto 5 cm. latis dense ovariiferis; partibus staminiferis superioribus obconicis cum staminibus 7 cm. longis 10 cm. latis basi 5 cm. latis apice 10 cm. latis densissime staminiferis;

appendice depresso-conico-globosa 6 cm. longa 19–20 cm. lata ad summum rotundata atro-purpurea cava hac atque illac grosse rugosa vel lævi toto minute tenuissime verrucosa. Fl. ♂: densissime dispositi, stamine 1; anthera sessilis transverse insita lineari-rectangulari flavescens 4–5 mm. longa 2–3 mm. lata apice truncata lævis, loculis adnatis linearibus crassis. Fl. ♀: pistillum densiuscule dispositum transverse insitum. Ovarium valde depresso-globosum glabrum leviter purpurascens 3 mm. longum 5 mm. latum læve 3-loculare, parietibus crassissimis, loculis parvis, ovulis solitariis loculum complete occupantibus; stylo columnari 1 cm. longo glabro leviter purpurascenti, stigmati terminali 3-lobato cinereo.

HAB. Tainanchō: Kareikōshō, Takunansha, leg. S. YŪKI, Mai. 1914, fl.

Near *Amorphophallus campanulatus* BLUME (ENGL. Arac. in ENGL. PRANTL Nat. Pfl.-fam. II-3, p. 127, fig. 81).

Cyperaceæ.

Cyperus LINN.

Key to the Formosan Species.

(Principally following to C. B. CLARKE in HOOK. f. Fl. Brit.

Ind. VI. pp. 597–619).

I. Inflorescence umbellate throughout or capitate; spikelets digitate or clustered, not spicate. Style-branches linear, rarely linear-lanceolate.

Very small slender annual, umbels nearly head-like, very rarely reduced to a single head. Spikelets small. Glumes mucronate.... *C. uncinatus*.

Small or middle-sized, annuals or perennials; rhizome 0, or in *C. Haspan* creeping. Leaves and branches moderately long, narrow, weak. Inflorescence umbellate. Glumes scarcely cuspidate.

Nut pale brown subequally trigonous *C. difformis*.

Nut pale brown ovoid $\frac{1}{3}$ – $\frac{1}{2}$ length of obtuse glume..... *C. Haspan*.

Nut marble-white plano-convex (plane face against rhachilla)

C. flavidus.

Tall perennial with green somewhat broad (broadest in the genus) often 3-nerved leaves. Umbels compound *C. diffusus*.

II. Inflorescence umbellate; spikes often more or less corymbd; spikelets (sometimes very shortly) spicate. Style-branches linear.

Series A. Rhachilla of spikelets not much winged. Leaves and bracts long (except in *C. malaccensis*).

Annuals, or sometimes flowering the second year.

Spikelets oblong or oblong-linear 12–25 mm. long 3 mm.–6 mm.

broad *C. compress.*

Spikelets linear 8 mm.–13 mm. long $1\frac{1}{2}$ mm. broad..... *C. Iria.*

Rhizome becoming woody, elongate stolons frequent. Large (or middle-sized.

Spikelets very narrow nearly filiformed $1\frac{1}{2}$ mm. broad.

Leaves usually few, topmost erect short green, sword-shaped, shortly caudate *C. malaccensis.*

Leaves many, topmost spreading, long, much exceeding inflorescence..... *C. distans, C. nutans, C. eleusinoides.*

(Note: I can not satisfactorily distinguish these three species one from another).

Spikelets much broader oblong or linear never filiformed $1\frac{1}{2}$ –3 mm. broad.

Spikelets broadly linear nearly 2 cm. long 2–3 mm. broad...

..... *C. procerus.*

Spikelets oblong or linear narrower and shorter, not exceeding 8 mm. in length.

Glumes not imbricate, rhachilla hairy..... *C. pilosus.*

Glumes densely imbricate, rhachilla glabrous.

Nut oblong $\frac{2}{3}$ mm. long *C. densespicatus.*

Nut elongately oblong nearly 1 mm. long.....

..... *C. mediorubra.*

Series B. Rhachilla of spikelets (usually conspicuously) winged.

Tall. Stolons long, hardening into creeping rhizomes. Leaves short, rarely $\frac{1}{2}$ length of stem. Glumes approximate, closely imbricate..

..... *C. tegetiformis.*

Tall. Rhizome very short, woody; stolons 0, i. e. lateral shoots from base of stem immediately ascending. Glumes scarcely imbricate in fruit..... *C. Zollingeri.*

Tall or medium plants, stoloniferous or rhizome woody. Leaves and

bracts long. Rhachilla of spikelets winged. Glumes closely imbricate.

Stem at the base nodosely thickened suddenly constricted into a long rhizome *C. rotundus*.

Rhizome woody long-creeping, stem at top trigonous at base nodose *C. stolonifer*.

Stolons elongate rather slender, stem tall at base bulbous woody; *C. tuberosus*.

Tall. Stolons 0. Leaves and bracts long. Umbel large compound, spikes and spikelets many. Rhachilla of spikelets conspicuously winged. Anthers apiculate, not rarely crested, style (with its 3 branches) small. Nut small, ashy black.

Spikes digitate scarcely peduncled long-cylindric dense, spikelets linear 12-30-fld., glumes closely imbricate, wings of rhachilla oblong persistent, anthers short-oblong not crested *C. radiatus*.

Spikes (some) peduncled long cylindric, spikelets very many linear 8-20-fld., glumes closely imbricate, wings of rhachilla oblong persistent, anthers oblong not crested . . . *C. exaltatus*.

Umbel large compound, rays divaricate, spikes cylindric, spikelets very many linear 6-40-fld., wings of rhachilla lanceolate yellow soon deciduous, anthers linear-oblong scarcely crested, nut oblong-obovoid $\frac{1}{2}$ length of glume *C. digitatus*.

Cyperus procerus ROTTE.; C. B. CLARKE in HOOK f. Fl. Brit. Ind.

VI. p. 610; HEMSL. Ind. Fl. Sin. III. p. 215.

HAB. Hokuto, leg. T. SŌMA, Nov. 1914.

Cyperus dense-spicatus HAYATA sp. nov. (Fig. 23-a-d). Caulis haud ramosus circ. 1 m. altus acute triqueter glaber erectus. Folia pauca linearia cum vaginis 60 cm. longa, laminis 7 mm. latis apice acuminatis margine integris haud scabris; foliis caulinis nullis, bracteis basi inflorescentiæ insitis foliiformibus 40-50 cm. longis 6 mm. latis inflorescentiam in longitudine multo exceedentibus glabris patentissimis. Inflorescentia duplicato-umbellata sessilis 10 cm. longa 15 cm. in diametro, radiis circ. 10 patentibus 10 cm. longis rectis simplicibus vel apice umbelluliferis, umbellulis sessilibus circ. 5-radiatis,

radiis 2–3 cm. longis a basi usque ad apicem densissime spiculiferis. Spiculæ lineares 7 mm. longæ 2 mm. latæ; squamis infima persistenti excepta caducissimis, mediis rotundatis $1\frac{1}{2}$ mm. longis $1\frac{1}{3}$ mm. latis dorso subcarinatis apice ad cuspedem brevem abeuntibus subplicatis nuculam amplectantibus. Nucula oblonga $\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata lævis apice basique obtusa facie plana dorso convexa subtrigona; stylus 3-fidus.

HAB. in paludosis Maruyama, leg. U. FAURIE, Mai. 1903, (No. 790).

Near *Cyperus pilosus* VAHL., but differs from it by the very much densely spicate and much shorter spikelets.

***Cyperus mediorubescens* HAYATA sp. nov.** (Fig. 23, e–g). Folia radicalia ignota. Caulis acute triquetus circ. 80 cm. altus glaber basi usque ad inflorescentiam simplex eramosus, bracteis manifestis 6 basi inflorescentiæ insitis; bracteis inæquilongis longioribus circ. 40 cm. longis 5–6 mm. latis apice acuminatis inflorescentiam in longitudine 5–6-plo æquantibus. Inflorescentia umbelliformis sessilis, radiis circ. 10 simplicibus vel apice umbelluliferis inæquilongis 4–10 cm. longis glabris, umbellulis (i.e. spicis spicularum) circ. 5–radiatis 2–5 cm. longis patentibus a basi usque ad apicem densissime spiculiferis. Spicæ (i.e. radii umbellularum) 2–5 cm.

longæ 1 cm. latæ sessiles densissime spiculiferæ, bracteolis basi spiculæ sitis singulis. Spiculæ lineares rectæ 6 mm. longæ $1\frac{1}{2}$ –2 mm. latæ apice basique obtusæ floribus utroque latere 10–12; squamis (glumis) mediis $1\frac{1}{2}$ mm. longis apice cuspidatis castaneis. Achæmium oblongum utrinque obtusum $\frac{2}{3}$ mm. longum læve subtrigonum dorso plus minus compressum plano-convexum dorso convexum facie planum; styli 3-fidi. Rhachilla latere compressa haud alata.

HAB. Akō: Sekisanshō, leg. G. NAKAHARA, Sept. 1905.

Near *Cyperus pilosus* VAHL., but different from it by the very much densely spicate, much shorter spikelets.

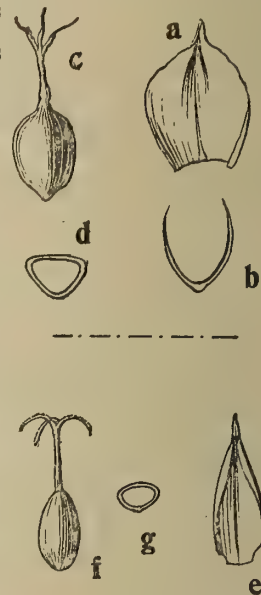


Fig. 23, a–d, *Cyperus densespicatus* HAYATA; a, a scale; b, the same in section; c, a nutlet; d, the same in section. e–g, *Cyperus mediorubescens* HAYATA; e, a scale; f, a nutlet; g, the same, in section.

Eleocharis R. Br.

Eleocharis acicularis R. BROWN; MATSUM. et HAYATA Enum. Pl. Formos. p. 480.

HAB. Taihoku: Koteishō, leg. Y. SHIMADA, Juli. 1914.

Eleocharis fistulosa LINK in HOOK. f. Fl. Brit. Ind. VI. p. 626.

HAB. Tōyen, leg. S. SASAKI, Nov. 1910.

Eleocharis capitata R. Br.; HOOK. f. Fl. Brit. Ind. VI. p. 627; MATSUM. et HAYATA Enum. Pl. Formos. p. 480.

HAB. Akō, leg. T. SŌMA, Mai. 1915.

"Roots fibrous, stems somewhat slender, spikelets small dense obtuse, bristles as long as nut retrorsely scabrous brown or ferruginous, nut black smooth, style 2-fid base small depressed pale". "Stems 2-14 in. Spikelets $\frac{1}{8}$ - $\frac{1}{2}$ in. pale. Bristles 7, or fewer. Nut as long as $\frac{2}{3}$ glume, compressed, obovoid."

***Eleocharis* (*Eu-eleocharis*—*Leiocarpiceæ*) Shimadai** HAYATA sp. nov. (Fig. 24). Annua. Caulis efoliatus 15-30 cm. longus $\frac{1}{2}$ mm. latus erectus

rectus glaber teres basi vaginis singulis instructus, vaginis 3 mm. longis tubulosis $\frac{1}{2}$ mm. latis haud fissis ore subtruncatis apice triangulari-acutis. Spicula solitaria terminalis oblonga cylindrica 7 mm.-20 mm. longa $2\frac{1}{2}$ -4 mm. lata apice acuta basi obtusa basi bracteis persistentibus singulis instructa, bracteis oblongis apice obtusissimis basi

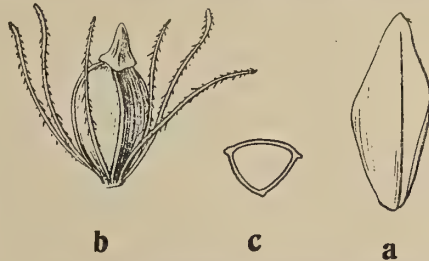


Fig. 24, *Eleocharis Shimadai* HAYATA; a, a scale; b, a nutlet with setae; c, the same in section.

spiculam semiamplectantibus hyalinis; squamis mediis rhomboideo-obovatis valde concavis $2\frac{1}{2}$ mm. longis $1\frac{1}{3}$ mm. latis apice obtusissimis basi subtruncatis. Setae 6 achænium in longitudine duplo æquantes filiformes retrorse scabrae. Achænium flavum obovoideum 1 mm. longum $\frac{1}{2}$ mm. latum læve dorso costato-angulatum facie planum in sectione triangulare apice obtusissimum basi angustatum, stylo basi valde dilatato, partibus dilatatis conicis apicem achæniî mitra-forme obtectis.

HAB. Hokuto, leg. Y. SHIMADA, (No. 14, typus) Oct. 1914; Daiburin,

leg. Y. SHIMADA, Mart. 1908, (No. 4320); Taikokan, leg. T. SÔMA, 1912, Oct.

Near *E. afflata* STEUD, but differs from it by the much longer bristles which are as long as $\frac{3}{4}$ nuts. In *E. afflata* and *E. japonica*, the bristles are hardly visible from without, but in this new species, they are very conspicuous, and exerted beyond the glumes.

***Fimbristylis* VAHL.**

***Fimbristylis* (Sect. *Dichelostylis*) *aginkotensis* HAYATA sp. nov.** (Fig. 25). Tenuissima dense cæspitosa 30–15 cm. alta. Folia basi caulis sita quam caulis multo breviora 8 cm. longa filiformia erecto-recurvata basi vaginata, vaginis $1\frac{1}{2}$ –4 cm. longis 1 mm. latis tubuliformibus ore obliquis, laminis filiformibus 3–10 cm. longis in plicato $\frac{3}{4}$ – $\frac{1}{4}$ mm. latis margine interiore recurvo-plicatis igitur teretibus gracillimis glabris. Scapi foliis duplo longiores 10–30 cm. longi $\frac{1}{2}$ mm. lati gracillimi teretes vel plus minus complanati glabri apice spiculam singulam gerentes et apice ad bracteas abeuntes, bracteis singulis vel duabus 5–7 mm. longis linearibus apice obtusis $\frac{1}{2}$ mm. latis spicas exceedentibus basi dilatatis. Spicula ovoidea 7–8 mm. longa 3 mm.

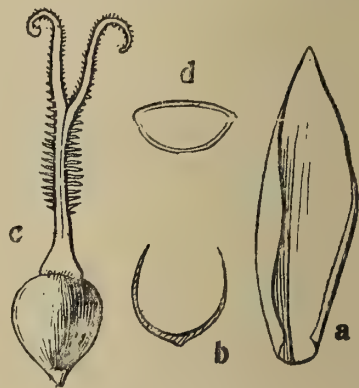



FIG. 25, *Fimbristylis aginkotensis* HAYATA; a, a scale; b, the same, in section; c, a nutlet with style; d, the same, in section.

lata apice obtusa basi rotundata, squamis mediis late oblongis 3 mm. longis $2\frac{1}{2}$ mm. latis apice breve acutis dorso ad setulam brevissimam productis. Nuculæ obovatæ $1\frac{1}{5}$ mm. longæ $\frac{4}{5}$ mm. latæ læves biconvexæ dorso plus facie minus convexæ apice subtruncatæ basi triangulari-acutæ flavo-fulvescentes; styli 2 mm. longi basi dilatati sursum sub ramificatione dense barbati deorsum prope basin glabri apice 2-fidi, ramis recurvis.

HAB. Agincort, leg. T. KAWAKAMI, 1907, Sept.

Near *F. ferruginea* VAHL, but differs from it by the much more dilated conical base of the styles and in the inconspicuously tessellate nuts.

***Fimbristylis* (Sect. *Dichelostylis*) *anpinensis* HAYATA sp. nov.** (Fig. 26). Planta dense cæspitosa basi densissime radicifera radicibus fibrillatis. Caulis gracilis 60–40 cm. longus glaber teres subrectus vel plus minus recurvus basi squamis

et foliis instructus basi sursum efoliatus inflorescentis exceptis haud ramosus, squamis infimis triangularibus minutis interioribus gradatim elongatis longioribus ad folium abeuntibus. Folia subacerosa recta erecta glabra cum vaginis 10–20 cm. longa, vaginis quam lamina duplo longioribus 2 mm. latis apice transverse vel plus minus oblique truncatis latere dorsali excepto tenuissime membranaceis hyalinis, laminis acerosis apice acutis vel obtusis margine plus minus plicato-recurvis in sectione -formibus glabris in explicato 1 mm. vel minus quam 1 mm. latis. Cymæ subumbellatæ vel corymbosæ, (radiis vel ramis 5–8, 1–6 cm. longis laxe et paucisque 1–5 spiculiferis), basi bracteis 4–5 suffultis, bracteis foliiformibus basi gradatim dilatatis basin cymæ amplexantibus 1–5 cm. longis nunquam ramos inflorescentiæ superantibus.

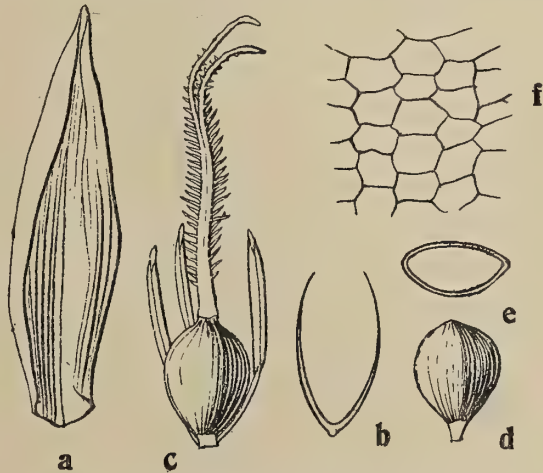


Fig. 26, *Fimbristylis anpinensis* HAYATA; a, a scale; b, the same in section; c, an ovary with the style and stamens; d, a nutlet; e, the same in section; f. cellular structure of the outer coat of the nutlet.

Spicula lineari-oblonga 1 cm. longa 3–4 mm. lata apice acuta basi obtusa; squamis mediis ovato-oblongis $4\frac{1}{2}$ mm. longis $2\frac{1}{2}$ mm. latis apice acutis obscure 1-costatis integris. Nucula obovata $1\frac{1}{3}$ mm. longa $\frac{4}{5}$ mm. lata apice truncato-rotundata basi cuneato-attenuata lævis facie minus dorso plus convexa. Styli $4\frac{1}{2}$ mm. longi apice 2-fidi (ramis glabris filiformibus $1\frac{1}{2}$ mm. longis recurvis) basi haud dilatati glabri supra basin usque ad ramificationem barbati.

HAB. Anpin, leg. TAKAGI, Oct. 1914.

Near *F. ferruginea*, but separable from it by the perfectly smooth nutlets.

***Fimbristylis* (sect. *Dichelostylis*) *boninensis* HAYATA sp. nov. (Fig. 27).**

Planta caespitosa ascendens. Caulis (vel scapus) 20–50 cm. longus erectus rectus valde complanatus (ut videtur) glaber in exsiccato multo-sulcato-striatus 2 mm.– $2\frac{1}{2}$ mm. latus apice capitatum spiciger basi squamis et foliis suffultus, squamis exterioribus ovatis, interioribus gradatim elongatis ad folium abeuntibus. Folia

coriacea ad basin caulis conferta cum vaginis 7-35 cm. longa 5-2½ mm. lata linearia erecta vel recurva glabra, vaginis 3-10 cm. longis cylindricis latere interiore tenuissime membranaceis hyalinis ore oblique truncatis minute hirsutis, laminis glabris coriaceis margine sub lente minute serrulatis margine exteriori leviter recurvis. Capitula spicularum globosa singulariter vel geminatim sita 2 cm. in diametro basi bracteis 2 instructa, bracteis 2-4 cm. longis foliiformibus horizontaliter divaricatis. Spicula dense 10-20 congesta ovoideo-fusiformis 8-12

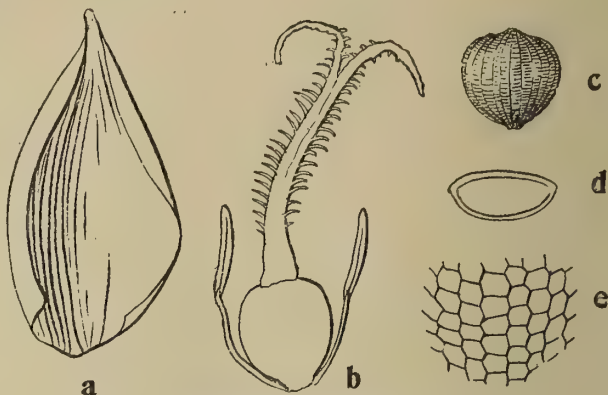


Fig. 27, *Fimbristylis boninensis* HAYATA; a, a scale; b, an ovary with the style and stamens; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet.

mm. longa 3-5 mm. lata apice acuta basi obtusa, squamis mediis ovato-triangularibus 3½ mm. longis totiusque latis apice breve cuspidato-acutis 1-costatis integris. Nucula obtriangulari-obovoidea 1½ mm. longa 1 mm. lata vel minus lata apice truncata ad centrum breve apiculata basi obtusa vel cuneato-obtusa longitudinaliter tessellata dorso plus facie minus convexa subplanoconvexa. Styli 3 mm. longi lineares ½ mm. lati apice 2-fidi, ramis recurvis, basi haud vel vix dilatati apicem nukulæ obtegentes medio sursum usque ad ramificationem dense barbati basi cum ramis glabri.

HAB. Bonin: Chichizima, leg. H. HATTORI, Sept. 1905.

Comparable to some extent to *F. sericea*, but greatly different from it by the very much longer glabrous leaves.

Fimbristylis (Sect. *Eleocharioides*) ***kagiensis*** HAYATA sp. nov. Annua? cæspitosa 10-15 cm. alta. Caulis (vel scapus) 8-15 cm. longus basi squamis foliis suffultus. Folia cum vaginis 6-15 cm. longa quam caulis longiora vel breviora suberecta vel ascenduntia lineari-filiformia vel acerosa glabra, vaginis 1½ cm. longis laminam ½-¾-plo æquantibus tubiformibus latere interiore tenuissime membranaceis, ore obliquo utraque latere auriculis rotundato-triangularibus

instructo ad insertionem laminæ breve ciliato, lamina 4–10 cm. longa margine interiore plicato-recurva in explicato 1 mm. lata margine glabra sed versus apicem breve serrulata ad apicem obtusa. Spicula terminalis solitaria ovoideo-globosa vel elongato-ovoidea 6–7 mm. longa 3 mm. lata basi bracteis singulis vel duabus instructa, bracteis minutis cuspidato-triangularibus 3 mm. longis basi $1\frac{1}{2}$ mm. latis caducissimis glabris margine hyalinis tenuissimis medio tri-nerviis. Squamæ valde concavæ glabræ 3 mm. longæ in explicato 3–4 mm. latæ rotundatæ brevissime mucronatæ basi truncatæ multinerviæ dorso medio castaneæ versus basin margineque hyalinæ ecoloratæ. Nuculæ biconvexæ $1\frac{1}{2}$ mm. longæ 1 mm. latæ apice fere rotundatæ basi plus minus cuneato-angustatæ fulvo-pallidæ, stylis plus minus exsertis 2 mm. longis basi plus minus incrassatis sursum barbatis apice 2-fidis, ramis gracillimis desuper recurvis haud barbatis rubro-ferrugineis.

HAB. Kagi, leg. T. SÔMA, Sept. 1914.

Near *F. polytrichoides* VAHL, but differs from it in having whitish nutlets with the barbate styles.

Fimbristylis (Sect. *Trichelostylis*) **kankaensis** HAYATA sp. nov. (Fig. 28). Rhizoma subrectum ramosum, radicibus et reliquis foliorum dense obtectum apice ad caulem abeuns.

Folia glabra basi caulis densissime fasciculata patentissima cum vaginis 4–5 cm. longa, vaginis valde dilatatis 13 mm. longis latissimis cum iis alteris connatis tenuibus, laminis linearibus basi latissimis sursum gradatim angustioribus basi 3– $3\frac{1}{2}$ mm. longis crasse coriaceis valde rigidis supra concavis subtus convexis margine sub lente minute

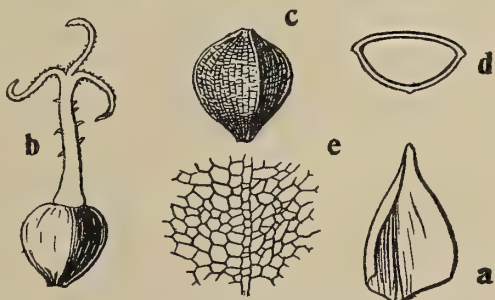


Fig. 28, *Fimbristylis kankaensis* HAYATA; a, a scale; b, an ovary with the style; c, a nutlet; d, the same in section; e, cellular structure of the outer coat of the nutlet, dorsal angle seen from front.

duplicato-serrulatis sursum subintegris apice obtusissimis. Scapi 10–18 cm. longi erecti recti graciles complanati (semper?) $\frac{2}{3}$ mm. lati glabri plus minus sulcati a centro fasciculorum foliorum basilarium oriundi basi squamis lineari-lanceolatis 3–4 instructi versus apicem cymosi 2–4 ramosi, ramis inæqualibus

minus quam 2 cm. longis ad apices spiculas capitulatim gerentibus. Spiculæ ad apicem ramulorum capitatim 4-5 sitæ rotundato-ovatæ 4-5 mm. longæ 3 mm. latæ apice obtusissimæ basi rotundatæ, squamis infimis (i.e. bracteolis?) sterilibus ovato-triangularibus apice acutis 2 mm. longis; squamis mediis ovato-triangularibus 2 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis dorso prominente carinatis. Nuculæ depresso-obovatæ $\frac{2}{3}$ mm. longæ totiusque latæ apice truncatæ basi acutæ sub lente minute tuberculatæ sursum fusco-fulvescentes deorsum flavo-fulvescentes vel maturo fusco-rubescens dorso valde convexæ vel angulato-convexæ facie subplanæ in sectione plano-convexæ vel subtrigonæ; styli $1\frac{1}{2}$ mm. longi 3-fidi subglabri.

HAB. Kankao, leg. B. HAYATA, Juli. 1914.

Comparable to some extent to *F. junciformis* KUNTH, but greatly different from it in having dark brown nuts with quite glabrous styles.

Fimbristylis (Sect. *Eleocharioides*) **takacensis** HAYATA sp. nov. (Fig. 29). Rhizoma ramosum fere erectum dense radiciferum. Caulis cæspitosus gracillimus circ. 20 cm. longus teres vel subcomplanatus $\frac{1}{2}$ mm. latus vel latior erectus apice plus minus recurvus apice ad bracteas singulas productus, bracteis interdum obsoletis filiformibus erectis spicam exceedentibus 1- $1\frac{1}{2}$ cm. longis. Folia ad basin caulis sita pauca 1-3 cum vaginis 10-15 cm. longis filiformia erecta, vaginis 2-3 cm. longis 1 mm. latis tubuliformibus ore obliquissimis glabris, auriculis late triangularibus $\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis, laminis 5-6 cm. longis in plicato latere complanatis $\frac{1}{3}$ mm. latis apice acutis^s margine integris prope apicem pauce minute obscure setuloso-serrulatis. Spicula solitaria

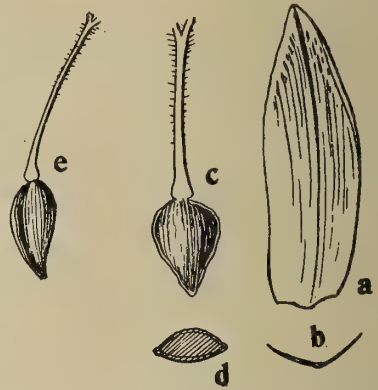


Fig. 29, *Fimbristylis takacensis* HAYATA; a, a scale; b, section of the same; c, a nutlet with the style; e, the same, seen from side; d, section of the same.

cylindrico-ovata circ. 1 cm. longa 3 mm. lata utrinque obtusa basi bracteis deciduis singulis instructa; squamis mediis oblongo-linearibus 3- $3\frac{1}{2}$ mm. longis 1 mm. latis apice obtusis vel triangulari-obtusis obtusissimis vel truncatis sursum castaneo-fulvescentibus medio margine basique ecoloratis. Achænium

(maturum) obovatum 1 mm. longum $\frac{2}{3}$ mm. latum facie subplanum dorso convexum in sectione sursum plano-convexum deorsum rhomboideum dorso facieque tuberculis minutis notatum apice obtuso-truncatum basi cuneato-acutum; stylus gracilis $2\frac{1}{2}$ mm. longus apice supra squamam exsertus supra medium pilosus supra medium 2-fidus, (ramis 1 mm. longis gracilibus recurvis), basi leviter dilatatus vel haud dilatatus glaber.

HAB. Takao, leg. Y. SHIMADA, Mai. 1915.

Near *F. polytrichoides* VAHL, but differs from it by the much larger spikelets and nuts which are as long as $\frac{1}{3}$ glume with much longer styles than nuts.

Fimbristylis (Sect. *Dichelostylis*) **tikushiensis** HAYATA sp. nov. (Fig. 30). Planta plus minus caespitosa. Caulis cum inflorescentiis 40–80 cm. longus brevissime hirsutus vel subglabratus teres in exsiccato multo-sulcatus basi sursum usque ad inflorescentiam haud ramosus erectus rectus basi squamis et foliis suffultus, squamis exterioribus ad folium abeuntibus. Folia basi caulis conferta erecta vel recurva linearia 30–40 longa 3–4 mm. lata apice obtusa basi vaginata supra

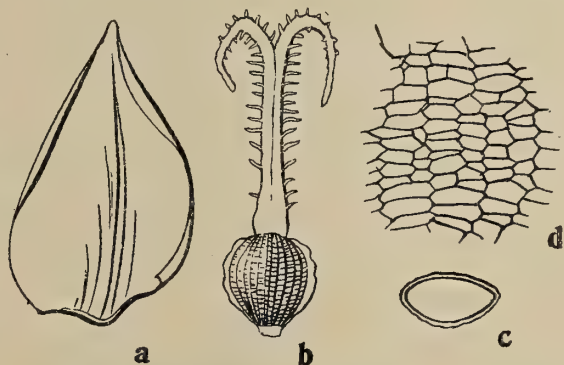


Fig. 30, *Fimbristylis tikushiensis* HAYATA; a, a scale; b, a nutlet, with the style; c, the same in section; d, cellular structure of the outer coat of the nutlet.

minus subtus plus villosa hirsuta, vaginis 5–15 cm. latis ore obliquis hirsutis. Inflorescentia 10–15 cm. longa cylindrico-pyramidalis in circumscriptione, basi umbellatim ramosa, ramis lateralibus inæqualibus 2–10 cm. longis, ramo centrali longissimo 15 cm. longo, apice spiculas singulas vel multas corymbose laxèque gerentibus, basi bracteis 5–8 quasiverticillatim instructa, bracteis foliiformibus vel acerosis 2–5 cm. longis inflorescentiam $\frac{1}{3}$ -plo æquantibus villosis. Spiculæ oblongæ 1 cm. longæ 5 mm. latæ apice acutæ, squamis mediis rotundato-triangularibus $3\frac{1}{2}$ mm. longis 3 mm. latis apice acutis. Nuculæ obovato-rotundatæ 1 mm. longæ $\frac{4}{5}$ mm. latæ apice truncatæ basi obtusæ biconvexæ

sub lente tessellatæ leviter elevato-tuberculatæ. Styli 3 mm. longi apice 2-fidi, (ramis recurvis), medio sursum usque ad ramificationem dense barbati basi glabri haud vel vix dilatati; ramis styli glabris.

HAB. Tikushiko, leg. Z. KOBAYASHI, Aug. 1907.

Near *F. diphylla* VAHL, but separable from it by the scabrous broader nutlets and villose leaves.

Scirpus LINN.

Scirpus (Sect. *Euscirpus*) **erecto-gracilis**

HAYATA sp. nov. (Fig. 31). Annua dense cæspitosa efoliata. Caulis simplex haud ramosus erectus triqueter glaber 7-25 cm. longus 1 mm. latus efoliatus basi vaginis 2-3 instructus, vaginis infimis brevibus, superioribus longioribus tubuliformibus 3-4 cm. longis 2 mm. latis ore obliquissimis apice acutis; caulis apice cyma singula terminatus et ad bracteam singulam abeuns, bracteis cauliformibus latere complanatis circ. 10 cm. longis 1 mm. latis glabris apice acutis erectis rectis. Cymæ ad apicem caulis quasilateraliter sitæ sessiles cum spiculis circ. 1 cm. longæ et latæ 8-10-spiculigeræ, spiculis sessilibus vel breve pedicellatis, pedicellis basi bracteis minutis instructis.

Spiculæ oblongæ 4 mm. longæ

2½ mm. latæ, basi bracteis (vel

squamis sterilibus?) singulis instructæ; squamis mediis 2½ mm. longis apice cuspidatis.

Nuculæ depresso-obovatæ 1½ mm. longæ 1 mm. latæ apice late breve acutæ basi breve cuneatæ in sectione

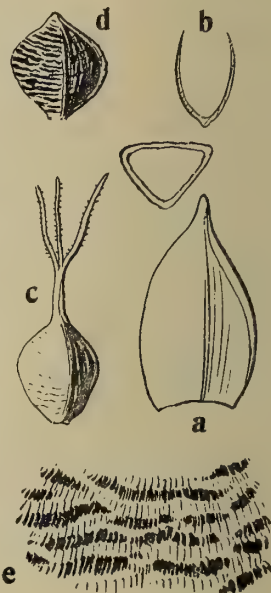


Fig. 31, *Scirpus erecto-gracilis* HAYATA. a, a scale; b, the same in section; c, an ovary; d, a nutlet; d, section of the same; e, cellular structure of the outer coat of the nutlet; transverse grooves and ridges are distinguished by black and white.

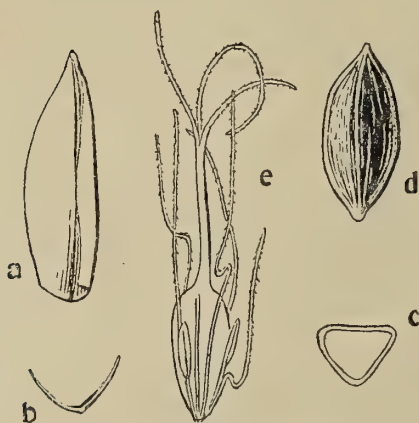


Fig. 32, *Scirpus morrisonensis* HAYATA; a, a scale; b, the same in section; c, a pistil with setae; d, nutlet; e, the same in section.

triangulares dorso angulato-convexæ facie planæ sursum fusco-rubescentes deorsum fulvescentes transverse rugulosæ.

HAB. Akō: Kōtanshō, leg. G. NAKAHARA, (No. 510), Sept. 1905; Biōritsu: Sōyoshō, leg. G. SHIMADA, Aug. 1907.

Related to *S. supinus*, *S. erectus* and *S. articulatus*; but different from them by the very much smaller spikelets and by the absence of bristles.

Scirpus morrisonensis HAYATA, (Fig. 32) Fl. Mont. Formos. p. 230.

Scirpus (Sect. *Euscirpus*) **Sasakii** HAYATA sp. nov.

Scirpus supinus LINN. ? "CLARKE in Hook. f. Fl. Brit. Ind. VI. p. 655:—Stems medium terete, spikelets in a single lateral head, glumes ovate keeled with suberect mucro, bristles 0, styles 3-fid, nut obovoid triquetrous obtuse transversely scabrous undulate black."

HAB. Tōyen, leg. S. SASAKI, Nov. 1910; Taihoku, leg. S. SASAKI, Juli. 1909.

It is with some hesitation that I have compared this plant to *S. supinus* LINN. The nuts of our plant are very faintly transversely muricated, the styles are 2-fid, bristles always present (6 in number), nuts plano-convex. Our plant is, however, certainly nearer to *S. supinus* than to *S. erectus* in the characters of carinate mucronate glumes and angular spikelets. The description of this new species will be given in the next volume.

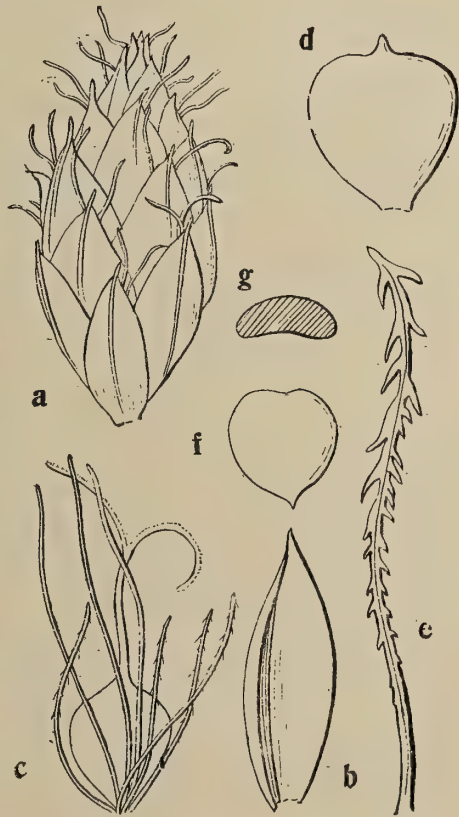


Fig. 33, *Scirpus Sasakii* HAYATA; a, a spikelet; b, a glume; c, an ovary with filaments and setæ; d, a nutlet; e, a seta (greatly magnified); f, a seed; g, section of the same.

Rhynchospora VAHL.

Rhynchospora glauca VAHL; C. B. CLARKE in HOOK f. Fl. Brit. Ind. VI. p. 671; HEMSL. Ind. Fl. Sin. III. p. 259.

HAB. Loo-choo: Nakanoshima, leg. S. KAWAGOI, Oct. 1910.

Rhynchospora longisetigera HAYATA sp. nov. Ad humidum vel aquam crescens haud cæspitosa semper solitaria; rhizoma ignotum versimiliter repens? Caulis tenuis gracilis 60–100 cm. altus erectus basi usque prope apicem haud ramosus versus apicem pauci-ramosus glaber triquetus 1–1½ mm. latus basi foliis radicalibus caulinis basilaribusque 4–5 suffultus. Folia radicalia caulinis multo breviora linearia circ. 10 cm. longa secus longitudine interiore plicata in plicato 1 mm. lata vel haud plicata plana tunc 2 mm. lata apice acuminata basi vaginato-dilatata, costa supra impressa subtus acute carinata, margine integra haud scabra lævia utraque pagine glabra apice acuminata, acuminibus interdum triquetris interdum subplanis. Folia caulina 3–4 remotissime disposita inferiora longiora cum vaginis 20–30 cm. longa foliis radicalibus longiora basi vaginata, vaginis 2–4 cm. longis tubuliformibus glabris ore truncatis, auriculis perfecte obsoletis, nervis lateralibus haud visis. Spiculæ versus apicem rami et caulis paucè corymbosæ vel subglomeratim 3–6 dispositæ breve pedicellatæ, pedicellis plus minus hirsutis 1–3-bracteatis, bracteis lineari-lanceolatis apice interdum setosis vel toto obsoletis; spiculæ lineari-fusiformes in maturo late fusiformes 6–7 mm. longæ utrinque acutæ, squamis inferioribus sterilibus brevioribus, infimis ovato-triangularibus 2 mm. longis 1 mm. latis apice subulatis, superioribus gradatim longioribus 1–2 fertilibus; squamis fertilibus ovato-lanceolatis 7 mm. longis 2½ mm. latis apice acuminatis ad summum ad setulam ⅓ mm. longam productis basi contractis angustissimis medio latissimis spiculam amplexantibus castaneis; costa obscura. Setæ 5, filiformes 4–4½ mm. longæ nuculam in longitudine 2-plo superantes antrorse scabræ. Stamina 3. Nucula obovata 2 mm. longa 1½ mm. lata apice late truncata basi cuneata biconvexa latere prominente carinata sub lente tenuissime elevato-reticulata castanea; stylus longissimus 8 mm. longus gracillimus filiformis medio sursum bifidus basi valde conico-dilatatus ad basin 1 mm. latus glaber.

HAB. Suisha, leg. B. HAYATA, Mai. 1912.

Near *R. glauca* Vahl; but separable from it in the very much longer setæ and longer spikelets.

Cladium P. BR.

Cladium jamaicense CRANTZ (Fig. 34); HAYATA Mater. Fl. Formos. p. 377. Our specimens are a little different from the typical form of the species. In the former, the spikelets are arranged in the less numerous clusters and the inflorescence is looser than in the latter.



Fig. 34, *Cladium jamaicense* CRANTZ; a, a cluster of spikelets.

Scleria BERG.

Scleria pubigera MAKINO.

HAB. Tōyen, leg. T. SŌMA, Oct. 1914; Daijiorin, leg. Y. SHIMADA, Oct. 1914.

Compared with a specimen so labelled in the Herbarium at Tōkyō. Our specimens are more patently or sometimes retrorsely hairy, while the Japanese are less patently hairy.

Carex LINN.

On working up the collections of *Carex*, I have principally followed the system of G. KÜKENTHAL appearing in ENGLER'S "Das Pflanzenreich: Cyperaceæ-Caricoideæ." Among the subgenera, *Primocarex* is not represented in Formosa, while *Vigneia* is represented by 1, *Indocarex* also by 5, and *Eucarex* by 28 species. As to the arrangement of the sections of the subgenus *Eucarex*, I have found it extremely difficult to follow KÜKENTHAL'S system. According to this eminent authority, the subgenus is divided into two groups on the basis whether utricles are "erostrati vel brevirostres raro longirostres, rostrum ore truncatum vel emarginatum raro leviter bidentatum," or "longius vel brevius rostrati, rostrum ore bidentatum raro integrum." This arrangement is not proved to be practicable in the Formosan species. The latter group is divided into two divisions on the basis whether leaves are "nunquam septatodosa" or "septato-nodosa." I am very much puzzled to understand

what is meant by "septato-nodosa." After some considerations, I became convinced that it means something like elevation of tessellate veinlets on the surface of the leaves, and therefore it means "gegittert." According to his system there are, however, included in the subgroup of "folia nunquam septato-nodosa" many species which have "folia septato-nodosa;" and there are also in the subgroup of "folia septato-nodosa," many plants whose leaves are not "septato-nodosa." On the whole, the clavis of the sections of the subgenus *Eucarex* given by KÜKENTHAL is not practicable, as far as are concerned the Japanese and Formosan species. As an example of the contradiction, I may point out *Carex alliiformis* included after his system in the subgroup of "folia nunquam septato-nodosa," and *C. pumila* referred to the subgroup of "folia septato-nodosa." The leaves of the former species have distinctly elevated tessellate veinlets, while those of the latter do not show any trace of elevated veinlets.

Conspectus of the subgenera of the Formosan Species.

- a. Spicules usually bisexual, sessile, cladophyllum (scale at the base of spicules) mostly wanting.....subg. *Vignea*.
- b. Spicules bisexual or unisexual often pedunculate, cladophyllum usually exists.
 - a. Spicules usually bisexual, cladophyllum utriculiformed....
subg. *Indocarex*.
 - β. Specules mostly unisexual, cladophyllum ocreæformed....
subg. *Eucarex*.

Subgenus **Vignea** NEES.

Spicules ♂ at the apex.

Sect. *Fœtideæ*.....*C. pseudo-arenicola*.

Spicules ♂ at the base.

Sect. *Elongatæ*: This is not represented in Formosa.

Carex pseudo-arenicola HAYATA sp. nov. (Fig. 35, f-j). Rhizoma repens plus minus ascendens teres supra quasi-1-seriatim caules vel fasciculos foliorum gerens. Fasciculus foliorum 5-6-foliatus basi squamis oblongis apice acutis 3-4 instructus, foliis linearibus cum vagina 17 cm. longis 2 mm. latis, vaginis tubuliformibus 3 cm. longis circ. 2 mm. latis ore perfecte truncatis,

laminis glabris chartaceo-membranaceis planis marginibus haud scabris. Caulis glaber basi foliis paucis instructus scapiformis circ. 20 cm. longus apice spiculas spicatum gerens, spicis 2-3 cm. longis 5 mm. latis; spicula terminali masculina, lateralibus bisexualibus. Spiculæ erectæ haud patentēs a se 2-4 mm. distantes; lateralibus 7-8-floratis, floribus superioribus masculinis cæterum foemineis; cladophyllum nullum. Fl. ♂: squamis oblongis 3 mm. longis; stamina 3, antheris linearibus $1\frac{1}{4}$ mm. longis apice fasciculo minuto singulo pilorum coronatis basi brevissime auriculatis. Fl. ♀: glumis (vel squamis) mediis ovato-lanceolatis 3-4 mm. longis $1\frac{1}{2}$ mm. latis apice acuminatis glabris 1-costatis margine erosis. Utriculus ovato-lanceolatus 4 mm. longus 1 mm. latus apice acuminato-attenuatus ad summum 2-dentatus basi obtusus dorso convexus facie planus margine sub microscopio remote minute setulosus dorso 5-castaneo-striatus glaber. Nucula oblonga glabra plano-convexa *Carex arenicola* HAYATA Mater. Fl. Formos. p. 378 (non F. SCH.)

HAB. Mt. Morrison, leg. T. KAWAKAMI et U. MORI, Oct. 1908.

Resembles *C. arenicola* F. SCHMIDT in the external features; but really distinct from it in having lanceolate utricles which are attenuate at both apex and base, and in the lack of spongy excrescence at the base of the utricles.

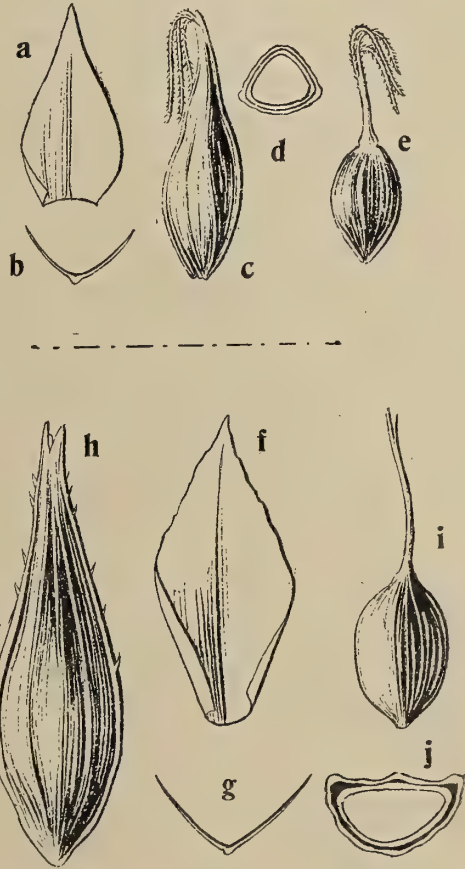


Fig. 35, a-e, *Carex satsumensis* FR. et SAV. var. *Nakaii* HAYATA; a, a scale; b, the same in section; c, an utricle; d, the same in section; e, a nutlet. f-j, *Carex pseudoarenicola* HAYATA; f, a scale; g, the same in section; h, an utricle; i, a nutlet; j, the same in section, with the utricle.

Subgenus **Indocarex** BAILL.

Spicules all supported by a fertile cladophyllum; bracts nearly none

sect. *Japonicæ*.

Spicules all supported by a sterile cladophyllum.

Spicules cylindrical 2-6 cm. long.....sect. *Polystachyæ*.

Spicules hardly longer than 1.5 cm.....sect. *Indicæ*.

Sect. *Japonicæ*.

Culms slender nearly 30 cm. long *C. satsumensis*, var. *longiculma*.

Culms very much shorter, usually 10 cm. long.. *C. satsumensis* var. *Nakaii*.

Carex satsumensis FR. et SAV. var. **longiculma** HAYATA n. v. (Pl. XVII.) Dense cæspitosa; rhizoma haud repens. Caulis circ. 30 cm. longus simplex haud ramosus glaber basi foliis 2-4 suffultus apice spicato-paniculiformis basibus exceptis haud foliatus. Folia basi caulis quasi-fasciculata longe vaginata cum vaginis 30-40 cm. longa caulem in longitudine superantia tenuiter chartacea glabra, vaginis tubuliformibus 5-10 cm. longis tenuiter membranaceis ore truncatis integris, laminis longe linearibus 20-30 cm. longis $2\frac{1}{2}$ -3 mm. latis apice longe lineari-acuminatis margine tenuiter scabriusculis utraque pagine glabris. Panicula terminalis singula circ. 6 cm. longa cylindrica $1-1\frac{1}{2}$ cm. lata basi et basi rami paniculae bracteis instructa erecta, ramis brevibus paucis 1 cm. longis ascendentibus haud patentibus interdum leviter patentibus; bractea cum cladophyllo singula sub ramo paniculae insita; bracteis infimis longissimis foliiformibus paniculam in longitudine superantibus; bracteis cæteris brevioribus 2-3 mm. longis subulato-linearibus basi dilatatis. Spiculæ a basi ramorum paniculae usque ad apicem vel in parte superiore paniculae spicatim dispositæ generaliter bisexuales (sed in ramo inferiore unisexuales tunc floribus lateralibus fœmineis, iis terminalibus masculinis); spiculæ inferiores interdum ad florem singulum fœmineum reductæ, superiores bisexuales cylindricæ 5-6 mm. longæ, floribus inferioribus fœmineis superioribus masculinis; spiculæ totæ basi bractea sterili et cladophyllo instructæ (vel cladophyllum rarius obsoletum); bracteis sterilibus triangulari-ovatis 2 mm. longis 1 mm. latis apice cuspidatis; cladophyllis ovatis $1\frac{1}{2}$ -2 mm. longis valde concavis subventricosis apice late truncatis leviter bidentatis vel haud dentatis exteriore reflexis utriculum reductum amplectantibus. Fl. ♂: squamis ovato-lanceolatis 3 mm. longis quam squama floris fœminei angustioribus apice

acutis; stamina 3, antheris linearibus $1\frac{1}{2}$ mm. longis $\frac{1}{2}$ mm. latis apice connectivo brevissimo apiculatis basi subtruncatis obscure brevissime auriculatis. Fl. ♀: squamis ovatis vel ovato-oblongis vel ovato-lanceolatis $1\frac{1}{2}$ –2 mm. longis apice acutis; utriculus fructifer ovato-fusiformis $2\frac{1}{2}$ –3 mm. longus $\frac{3}{4}$ mm. latus glaber obscure costulatus apice gradatim attenuatus ad summum brevissime minuteque 2-dentatus basi obtusus. Nucula ellipsoidea $1\frac{1}{4}$ mm. longa $\frac{2}{3}$ mm. lata fusco-castanea apice basique obtusa lævis; stylus basi dilato-incrassatus interdum geniculato-recurvus apice trifidus glaber.

HAB. in monte Morrison, 6000 ped. alt., leg. T. KAWAKAMI et S. SASAKI, Oct. 1909.

Differs from the type by the much longer and slenderer culms with longer leaves and by the tubi-formed cladophylla.

Carex satsumensis FR. et SAV. var. **Nakaii** HAYATA n. n. (Fig. 35, a-e). Cæspitosa 6–7 cm. alta. Folia basi caulis fasciculata, (fasciculis 5–8-foliatis basi squamis oblongis instructis, squamis superioribus gradatim ad folium abeuntibus), erecta vel patentia linearia cum vaginis 6–8 cm. longa cum cauli æquilonga vel quam caules breviora; foliis exterioribus basi vaginatis sed iis interioribus haud vaginatis, vaginis tubulosis circ. 1 cm. longis 2– $2\frac{1}{2}$ mm. latis glabris ore perfecte truncatis integris; ligulis brevissimis lamelliformibus integris; laminis linearibus 5–6 cm. longis 3 mm. latis apice acuminatissimis subplanis coriaceis lævibus margine scaberrimis. Caulis cum spica 7–8 cm. longus acute triqueter glaber erectus $\frac{2}{3}$ mm. latus lævis; spica $2\frac{1}{2}$ cm. longa cylindrica 1 cm. lata densiuscule spiculigera, spiculis horizontaliter patentibus; bracteis deciduis linearibus quam spica brevioribus. Spiculæ lineares 8 mm. longæ; terminali masculina, lateralibus bisexualibus; laterales deorsum flores fœmineos sursum flores masculinos gerentes; squamis infimis (i. e. cladophyllis) ovatis dorso basi ventricosis basin spiculæ amplexantibus 2 mm. longis apice obtusis; squamis mediis ovato-triangularibus apice acutis basi perfecte truncatis 2 mm. longis glabris. Utriculus ovoideo-fusiformis $2\frac{1}{2}$ mm. longus $\frac{2}{3}$ mm. latus glaber dorso convexus facie subplanus in sectione trigonus dorso multo tenuiter elevato-striatus facie haud striatus apice attenuatus basi obtusus apice brevissime 2-dentatus. Nuculæ oblongæ $1\frac{1}{2}$ mm. longæ $\frac{2}{3}$ mm. latæ nigricantes trigonæ dorso convexæ facie planæ apice basique obtusæ infra summum constrictæ apice ad stylum abeuntes læves.

HAB. Monte Morrison, ad 9000
ped. alt., leg. S. SASAKI, Oct. 1909;
montibus centralibus, leg. U. MORI et
S. NAKAI, Dec. 1909.

Differs from the type by the
much shorter culms and by the
tubiformed cladoprophylla.

Sect. *Polystachyæ*.

Carex baccans NEES. (Fig. 36,
a-f); MATSUM. et HAYATA Enum.
Pl. Formos. p. 493.

Sect. *Indicæ*.

a. Partial panicles explicate.

a. Spicules very much slender
..... *C. pseudo-filicina*.

β. Spicules oblong, stronger than
the preceding species.
..... *C. filicina*.

b. Partial panicles contracted.
..... *C. hakkuensis*.

Carex pseudofilicina HAYATA
(Fig. 36, g-k), Mater. Fl. Formosa.
p. 391.

Carex filicina NEES.; MATSUM.
et HAYATA Enum. Pl. Formos. p.
495.

Carex hakkuensis HAYATA
sp. nov. (Fig. 37). Rhizoma ignotum.
Caulis triqueter circ. 1 m. altus glaber
foliatus. Folia radicalia ignota; cau-
lina erecta cum vaginis 30-40 cm.
longa glabra, vaginis triquetris cy-
lindricis 5-6 cm. longis 6 mm. latis

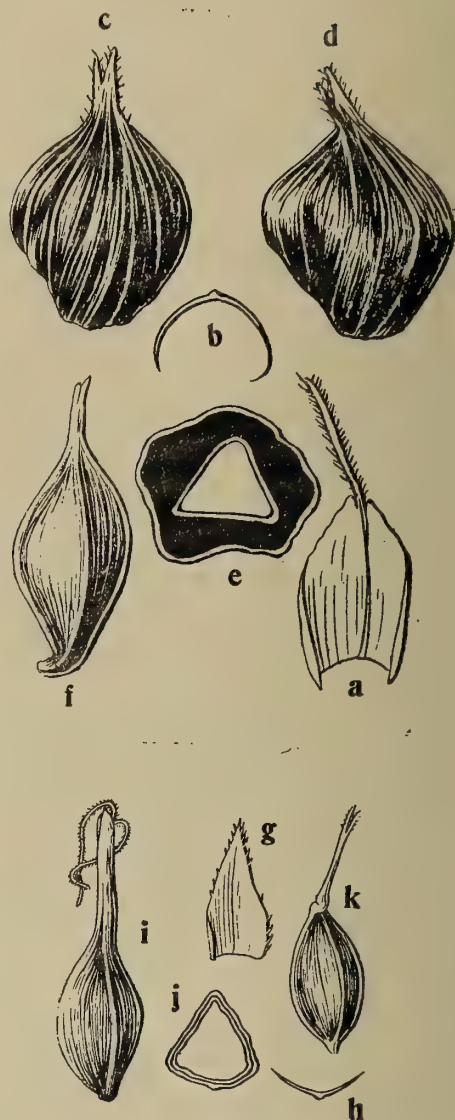


Fig. 36; a-f, *Carex baccans* NEES; a, a glume; b, the section of the same; c, an utricle; d, the same, seen from another side; e, section of the same; f, a nutlet. g-k, *Carex pseudofilicina* HAYATA; g, a glume; h, the section of the same; i, an utricle; j, the section of the same; k, a nutlet.

glabris ore obliquis nervosis, laminis linearibus 25–35 cm. longis 1 cm. latis apice acuminatissimis utraque pagine lævibus glabris margine scabris, acuminibus supra scaberrimis subtus lævibus. Panícula terminalis 15 cm. longa in ambitu cylindrica 4 cm. lata ad nodos foliata, ramis paniculæ eretis 12 cm. longis semiteretibus ad angulos minute hirsutis a basi usque ad supra medium haud ramosis versus apicem ramulos 4–5 gerentibus, ramulis a basi usque ad apicem spiculigeris basi bracteis minutis singulis instructis; bracteis ovatis 2 mm. longis apice 2-fidis dorso interdum apice setigeris,

(setis 3 mm. longis hirsutis) basi amplexicaulibus; ramulis ordinis I. et II. basi bracteis singulis et cladoprophyllis singulis instructis hirsutis; cladoprophyllis ramuli ordinis I. semi-urceolatis 2 mm. longis dorso infra apicem ventricosus basin rhachis semi-amplectantibus apice expansis 2-fidis dorso minute plus minus hirsutis dorso nervosis apice margineque tenuiter membranaceis medio basique crassiusculis; bracteis singulis basi spiculæ insitis late ovatis $2\frac{1}{2}$ mm. longis 3 mm. latis apice subito subulato-acutis membranaceis; cladoprophyllis basi spiculæ insitis late ovatis $1\frac{1}{3}$ mm. longis 1 mm. latis intus valde concavis extus valde convexis dorso plus minus minute hirsutis apice truncatis 2-dentatis sterilibus. Spiculæ toto bisexuales cylindrico-fusiformes 8–10 mm. longæ $1\frac{1}{2}$ –2 mm. latæ apice acutæ basi obtusæ, floribus paucis basilari-bus fœmineis cæteris masculinis. Fl. ♂: squamis floris masculini elongato-ovatis $4\frac{1}{2}$ mm. longis $2\frac{1}{3}$ mm. latis membranaceis apice obtusis medio tenuiter triner-viis, antheris 3 linearibus 2 mm. longis $\frac{1}{3}$ mm. latis apice obtusis apice sub microscopio pilis minutis setiformibus 4–5 instructis. Fl. ♀: squamis floris fœminei ovatis $2\frac{1}{3}$ –3 mm. longis circ. 2 mm. latis apice acutis basi leviter contractis. Utriculus fructifer elongato-ellipticus apice attenuatus $3\frac{2}{3}$ mm. longus $1\frac{1}{4}$ mm. latus sursum minute hirsutus deorsum glaber trigonus basi

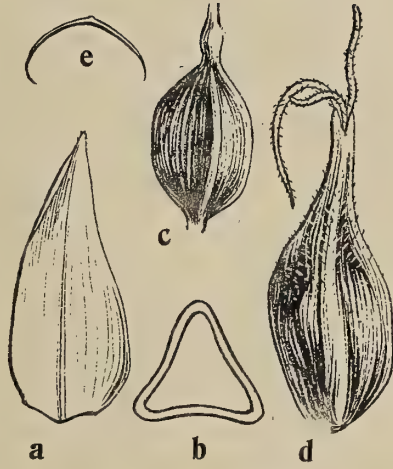


Fig. 37, *Carex hakkuensis* HAYATA; a, a glume; b, an utriculus; c, a nutlet; d, the section of the same; e, the section of the glume.

obtusus apice 2-dentatus. Nucula fusco-castanea trigono-oblonga $1\frac{1}{2}$ mm. longa 1 mm. lata apice obtusa ad stylum abeuns basi acuta ad stipitem 0.3 mm. longum abeuns trigona ad angulos prominente carinata facie leviter concava; stylus basi plus minus incrassatus apice 3-fidus.

HAB. Hakkutaisan, leg. U. MORI, Sept. 1910.

Subgenus **Eucarex** COSS et GERM.

Utricles not, or very shortly, rostrate.

Female spicules densely flowered, bracts not vaginate..Sect. *Maximæ*.

Female spicules loosely flowered, bracts usually vaginate. Nutlet.

mitrate at the apex.....Sect. *Mitratoæ*

Utricles long or shortly rostrate, beak 2-toothed rarely entire.

Leaves never septato-nodose (excepting *Carex alliiformis*)

Scales ♀ dark purple or dark brown.....Sect. *Frigidæ*.

Scales ♀ ferrugineous or pale, rarely dark-brown.

Beaks of utricles 2-toothed or entire.

Spicules ♀ mostly loosely flowered, bracts mostly vaginate;
utricles nearly straight ovate-elliptical or narrower,
pale green obsoletely nervose....Sect. *Hymenochlæne*.

Spicules ♀ densely flowered, bracts mostly not vaginate;
utricles at length divaricate, ovate, rich brown or
dark green, many-nerved.....Sect. *Tumidæ*.

Beaks of the utricles conspicuously 2-toothed.....

Sect. *Rhomboidales*.

Leaves septato-nodose (*Carex pumila* excepted)

Utricles glabrous

Utricles membranaceous long rostrate...Sect. *Pseudo-cyperæ*.

Utricles subcoriaceous or suberous shortly rostrate.....

Sect. *Paludosæ*.

Utricles more or less hirsuteSect. *Hirtæ*.

Sect. *Maximæ*.

Carex maculata BOOTT; MATSUM. et HAYATA Enum. Pl. Formos. p.

Sect. *Mitratae*.

1. Bracts shortly vaginate at the base; spicules ♀ oblong densely flowered. 2
- Bracts long vaginate at the base; spicules ♀ narrowly cylindrical subloosely flowered. 3
2. Scales of ♀ and ♂ long caudate at the apex. *C. breviculmis*.
Scales of ♀ and ♂ very shortly caudate at the apex. *C. morrisonicola*.
3. Scales of male flowers acute at the apex. *C. orthostemon*.
Scales of male flowers very obtuse or truncate at the apex. 4
4. Male spicules narrowly cylindrical. *C. tristachya* var. *pocilliformis*.
Male spicules broadly cylindrical. *C. transalpina*.

Carex breviculmis R. BR. (Fig. 38, a-e); MATSUM. et HAYATA Enum. Pl. Formos. p. 493. = *Carex chinensis* HAYATA Mater. Fl. Formos. p. 381 (non Retz.).

Carex morrisonicola HAYATA Mater. Fl. Formos. p. 387.

Carex tristachya THUNB. var. **pocilliformis** KÜK. (Fig. 38, j-m); MATSUM. et HAYATA Enum. Pl. Formos. p. 496. Cæspitosa. Caulis basi foliis 3-4 suffultus glaber erectus

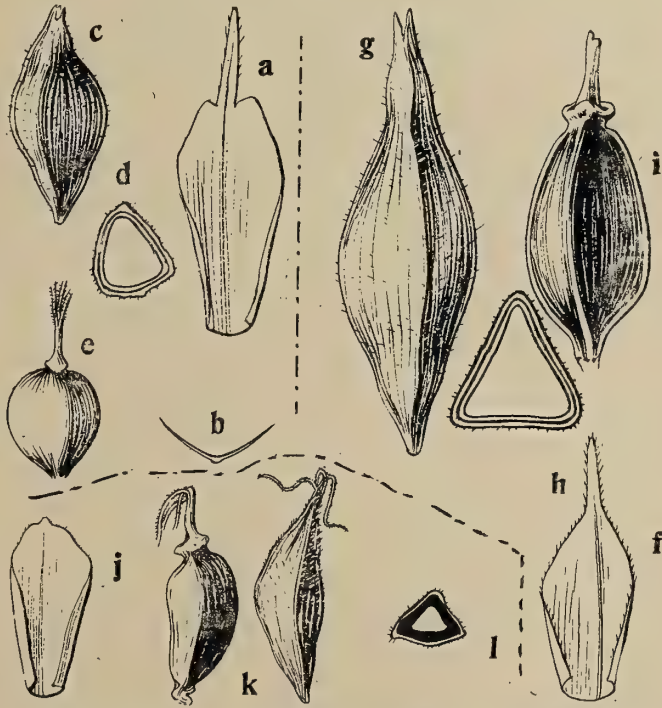


Fig. 38, a-e, *Carex breviculmis* R. BR; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet. f-i, *Carex orthostemon* HAYATA; f, a glume; g, an utricle; h, section of the same; i, a nutlet. j-m, *Carex tristachya* THUNB. var. *pocilliformis* KÜKENTH.; j, a glume; k, an utricle; l, section of the same; m, a nutlet.

gracillimus 20–25 cm. longus paucissime ramosus vel haud ramosus versus apicem spiculas 2–4 gerens. Folia basi caulis 3–4-quasi-fasciculata tenuiter coriacea haud rigida glabra vaginata cum vaginis 10–25 cm. longa quam caulis breviora, vaginis 3 cm. longis $1\frac{1}{2}$ mm. latis ore obliquis integris, (ligulis integris brevissimis lamelliformibus), laminis linearibus 7–22 cm. longis 2 mm. latis apice acuminatis margine subintegris sed sub lente retrorse minute molleque setulosis utraque pagine glabris. Spiculæ paucæ versus apicem caulis 2–4 sitæ; inferiores lateralesque fœmineæ; terminales bisexuales sursum floribus fœmineis deorsum floribus masculinis instructæ; vel terminales masculinæ. Spiculæ masculinæ erectæ terminales triquetra cylindrico-filiformes 1–2 cm. longæ $\frac{1}{2}$ – $\frac{2}{3}$ mm. latæ, (bracteis obsoletis). Fl. ♂; squamis mediis vagini-formibus 2 mm. longis apice obtusissimis tenuiter hirtellatis ore obliquissimis glabris; stamina 3, filamentis glabris brevibus dilatatis fere perfecte se connatis, antheris linearibus 1 mm. longis apice basique truncatis; rhachillæ rectæ. Spiculæ fœmineæ cylindrico-lineares 15–18 mm. longæ 3 mm. latæ erectæ sessiles vel graciliter pedicellatæ. Fl. ♀: squamis mediis triangulari-ovatis 2 mm. longis $1\frac{1}{2}$ mm. latis utriculū fere amplectantibus 1-costatis apice triangulari-obtusis glabris. Utriculus trigono-obovoideus $2\frac{1}{3}$ mm. longus 1 mm. latus apice breve late oblique rostratus, (rostris exteriore recurvis) basi cuneatus hirsutus multo costulatus apice haud dentatus sed tenuissime fissus crassiusculus. Nucula castanea trigono-rhomboideo-obovoidea $1\frac{2}{3}$ longa 1 mm. lata sublævis apice truncata basi oblique constricta brevissime stipitata, stipite crasso, apice truncata plus minus depressa partibus basis styli dilatatis mitriformibus coronata. Stylus apice trifidus. Bractæ basi spiculæ infimæ insitæ foliiformes spiculas 2-plo superantes.

HAB. Ritōzan, leg. T. KAWAKAMI, Juli. 1913, (No. 4).

Near *C. tristachya* THUNB.; but differs from it in having obovate, much shorter nutlets.

Carex orthostemon HAYATA (Fig. 38, f–i), Mater. Fl. Formos. p. 389.

Carex transalpina HAYATA Mater. Fl. Formos. p. 398.

Sect. *Frigida*.

Scales of male flowers distinctly costate, costa pale yellow.... *C. Shimadai*.

Scales of male flowers not at all or very slightly costate... *C. fulvorubescens*.

Carex Shimadai HAYATA (Fig. 39, a-e), Mater. Fl. Formos. p. 396.

Carex fulvo-rubescens HAYATA (Fig. 39, f-j), Mater. Fl. Formos. p.

383.

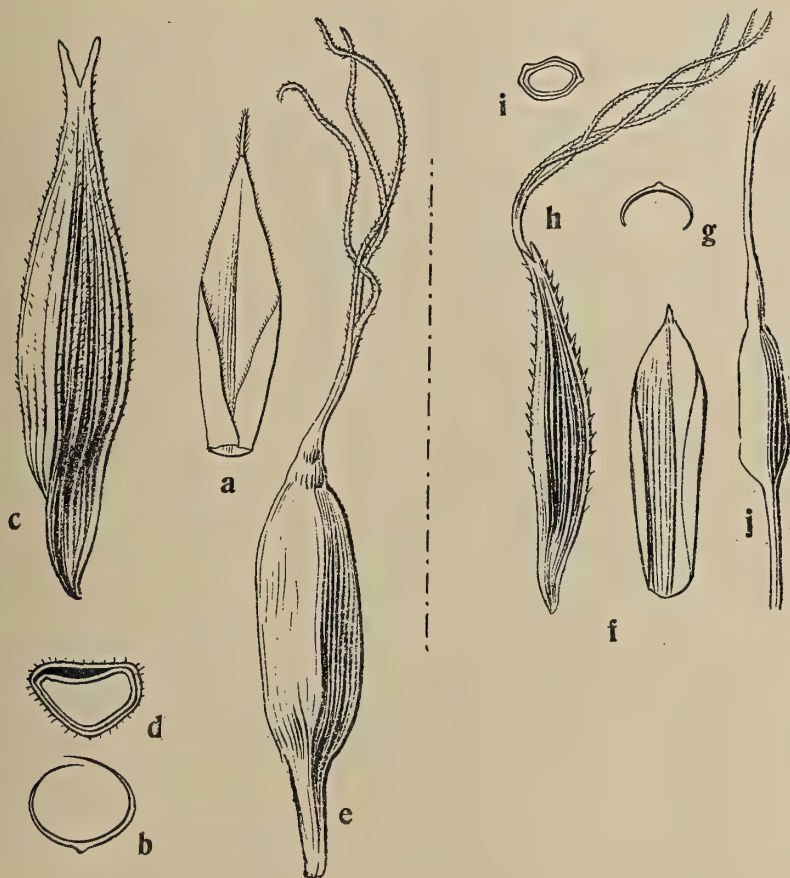


Fig. 39, a-e, *Carex Shimadai* HAYATA; a, a glume; b, section of the same; c, an utricle; d, section of the same; e, a nutlet. f-j, *Carex fulvo-rubescens* HAYATA; f, a glume; g, section of the same; h, an utricle; i, section of the same; j, a nutlet.

Sect. *Hymenochlaene*.

Carex longispica HAYATA Mater. Fl. Formos. p. 386.

Carex Nakaharai HAYATA (Fig. 40, a-d), Mater. Fl. Formos. p. 387.

Carex bilateralis HAYATA (Fig. 40, e-i), Mater. Fl. Formos. p. 380.

Carex brunnea THUNB. (Fig. 40, j-n); MATSUM. et HAYATA Enum. Pl. Formos. p. 493.

HAB. Kōtōshō, leg. T. KAWAKAMI et S. SASAKI, Juli. 1912.

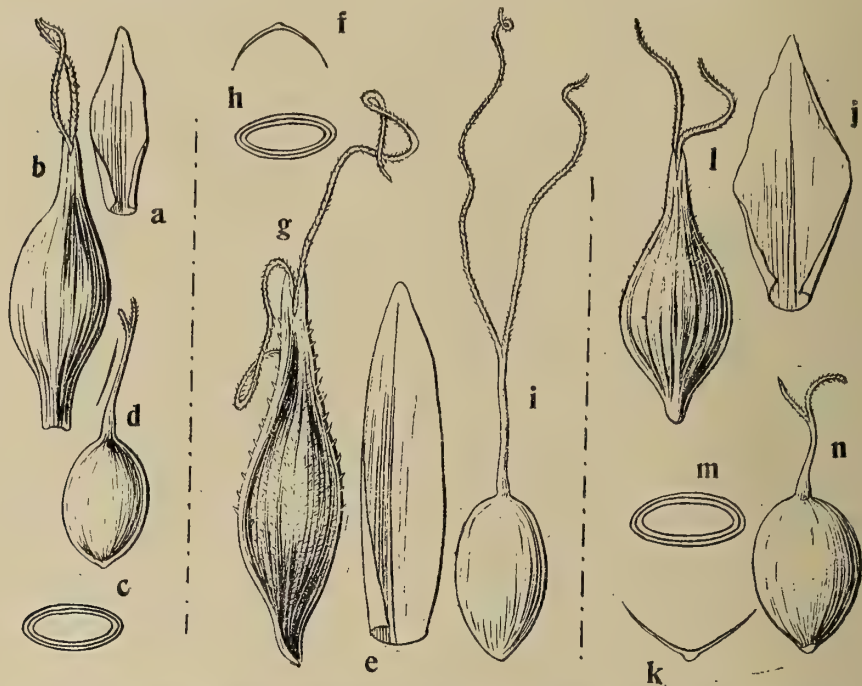


Fig. 40, a-d, *Carex Nakaharai* HAYATA; a, a glume; b, an utricle; c, section of the same; d, a nutlet. e-i, *Carex bilateralis* HAYATA; e, a glume; f, section of the same; g, an utricle; h, section of the same; i, a nutlet. j-n, *Carex brunnea* THUNB.; j, a glume; k, section of the same; l, an utricle; m, section of the same; n, a nutlet.

Sect. *Tumidæ*.

Lateral spicules ♀, with a few male flowers at the base, bracts long vaginate, vaginæ purple, ♀-scales fusco-rubescens..... *C. alliiformis*.

Lateral spicules only ♀, bracts not vaginate, ♀-scales pale-yellow, or sordid stramineous.

Utricles $2\frac{1}{2}$ mm. long..... *C. pseudojaponica*.

Utricles 4 mm. long..... *C. Kawakamii*.

Carex alliiformis C. B. CLARKE; KÜKENTHAL Cyper.-Caricoid. in Pfl.-reich p. 618. *Carex purpurascens* KÜK.; MATSUM. Ind. Pl. Jap. II.-1 p. 129.

HAB. Okinawa.

Carex pseudojaponica HAYATA (Fig. 41, c-d), Mater. Fl. Formos. p. 392.

Carex Kawakamii HAYATA (Fig. 41, e-h), Mater. Fl. Formos. p. 385.

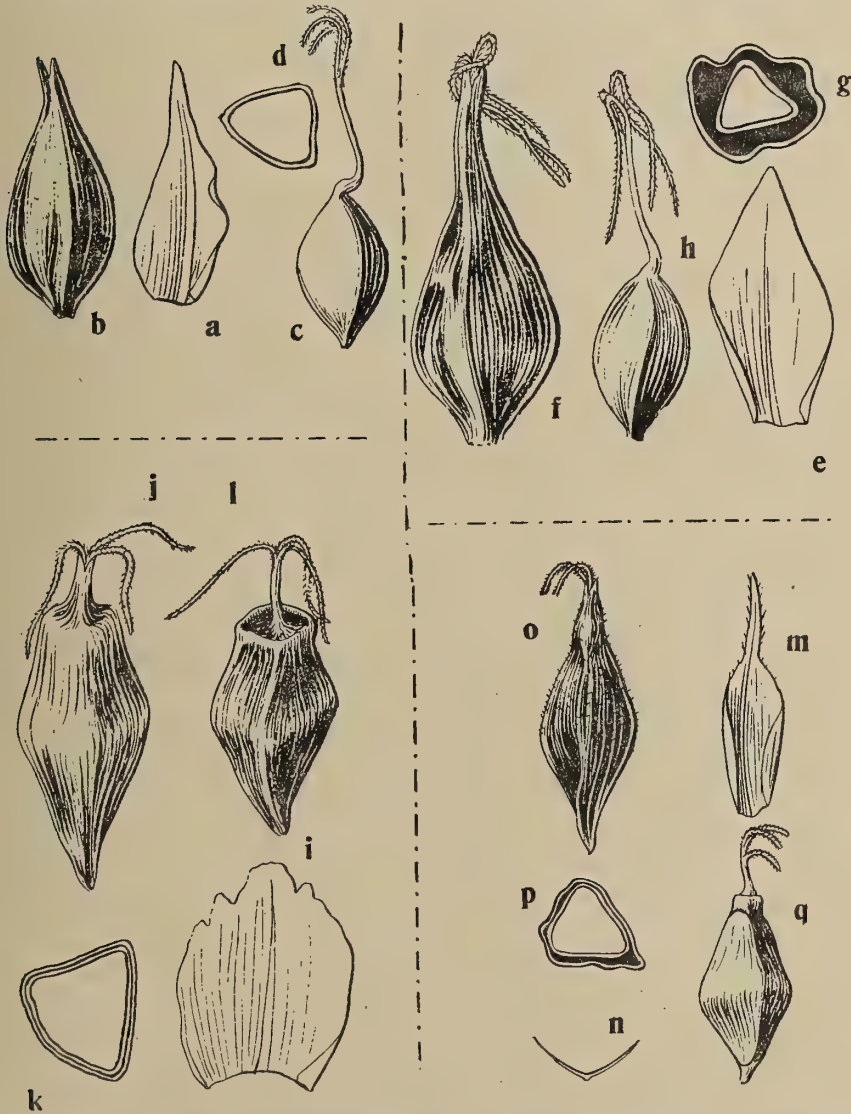


Fig. 41, a-d, *Carex pseudojaponica* HAYATA; a, a glume; b, an utricle; c, nutlet; d, section of the same. e-h, *Carex Kawakamii* HAYATA; e, a glume; f, an utricle; g, section of the same; h, a nutlet. i-j, *Carex obtusobracteata* HAYATA; i, a glume; j, an utricle; k, section of the same; l, a nutlet. m-q, *Carex chinensis* RETZ; m, a glume; n, section of the same; o, an utricle; p, section of the same; q, a nutlet.

Sect. *Rhomboidales*.

1. Male spicules lineari-cylindrical. Female spicules cylindrical..... 2
Male spicules often subclavate. Female spicules oblong or ovate.....
C. arisanensis.
2. Scales obtuse..... *C. obtusobracteata*.
Scales acute or caudate..... 3
3. Culms lateral..... *C. atronucula*.
Culms central..... *C. chinensis*.

Carex arisanensis HAYATA (Pl. XVIII.) Mater. Fl. Formos. p. 378.

Dense caespitosa; rhizoma haud repens. Caulis tenuissimus primum erectus sed fructibus maturis deorsum recurvus trigonus ad angulos anguste alatus interdum efoliatus basi squamis linearibus instructus, interdum foliis radicalibus et foliis caulinis basilaribus suffultus glaber simplex vel interdum versus apicem ramo singulo instructus; squamis basi caulis 3-4-sitis. Folia 3-4-fasciculata (fasciculis basi squamis 3-4-suffultis), cum vaginis 10-40 cm. longa cauli breviora vel æquilonga, vaginis 1-3 cm. longis primum tubiformibus demum toto fissis triquetris dorso prominente carinatis utroque latere apicis auricula 5 mm. longa apice obtusa $\frac{2}{3}$ mm. lata latere altero cum laminis connata latere altero libera tenuissime membranacea integra instructis glabris; laminis linearibus 7-40 cm. longis 3-7½ mm. latis apice lineari-acuminatis, costa supra impressa subtus carinato-elevata, utraque pagine glabris margine scaberrimis chartaceis suberectis. Caules vel rami caulis apice spiculas 1-3 gerentes, spiculis se approximatis. Spicula terminalis singula masculina, iis lateralibus foemineis vel bisexualibus bractea singula instructis, bracteis spicam in longitudine æquantibus vel eam superantibus; spicula lateralis breve vel longe pedicellata, pedicellis basi vagina una instructis, vaginis tubiformibus 1 mm. longis subventricosus hyalinis cladophylli-formibus; spicula masculina pedicellata, (pedicellis 2 mm. longis haud vaginatis), subclavato-cylindrica 6 mm. longa 1 mm. lata triquetra apice obtusa; squamis mediis oblongis 2½ mm. longis 1 mm. latis apice obtusissimis integris 1-costatis basi rhachin complete

amplectantibus; stamina 3, filamentis filiformibus 3 mm. longis basi plus minus dilatatis, antheris linearibus 2 mm. longis $\frac{1}{3}$ mm. latis apice subacutis basi subtruncatis. Spicula feminea in ambitu cylindrica 6 mm. longa 2 mm. lata 5-6-florata; matura 2-3 fructifera; squamis mediis fructiferis ovato-oblongis $2\frac{1}{2}$ mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi rhachin semi-amplectantibus glabris integris. Utriculus maturus trigonus ovoideus fusiformis apice longe-rostratus cum rostris 6 mm. longus 2 mm. latus basi acutus tenuiter multi-striatus glaber, rostris 2-3 mm. longis apice 2-dentatis. Nucula obovoideo-trigona 3 mm. longa 2 mm. lata apice obtusissima basi acuto-obtusa subflava lævis; stylus ad basin geniculatim anteriore recurvus tunc subito angulo recto ascendens apice 3-fidus glaber.

HAB. Mt. Arisan, 7400 ped. alt., leg. B. HAYATA, Aprili. 1914.

Very much resembles *C. filipes* FR. et SAV. (KÜKENTHAL Cyperaceæ-Caricoideæ in ENGL. Pfl.-reich p. 640, fig. 109), but differs from it in the more approximately flowered female spicules, and in the very much shortly peduncled male spicules. A sheath which is very much like cladophyllum is always present at the base of the pedicel of a lateral spikelet.

Carex obtusobracteata HAYATA sp. nov. (Fig. 41, i-l).

The description will be given in the next volume.

Carex atronucula HAYATA Mater. Fl. Formos. p. 379.

Carex chinensis RETZ. (Fig. 41, m-q); BOOTT Illustr. I. (1858) pp. 13 et 74 t. 36; MATSUM. et HAYATA Enum. Pl. Formos. p. 494.

Carex sociata HAYATA Mater. Fl. Formos. p. 398 (non BOOTT.)

Sect. *Pseudo-cypereæ*.

Carex Sasakii HAYATA (Fig. 42, a-e), Mater. Fl. Formos. p. 395.

HAB. Nantō: Suisha, leg. U. MORI, (No. 3749).

Sect. *Paludosæ*.

Carex pumila THUNB. (Fig. 43); MATSUM. et HAYATA Enum. Pl. Formos. p. 496.

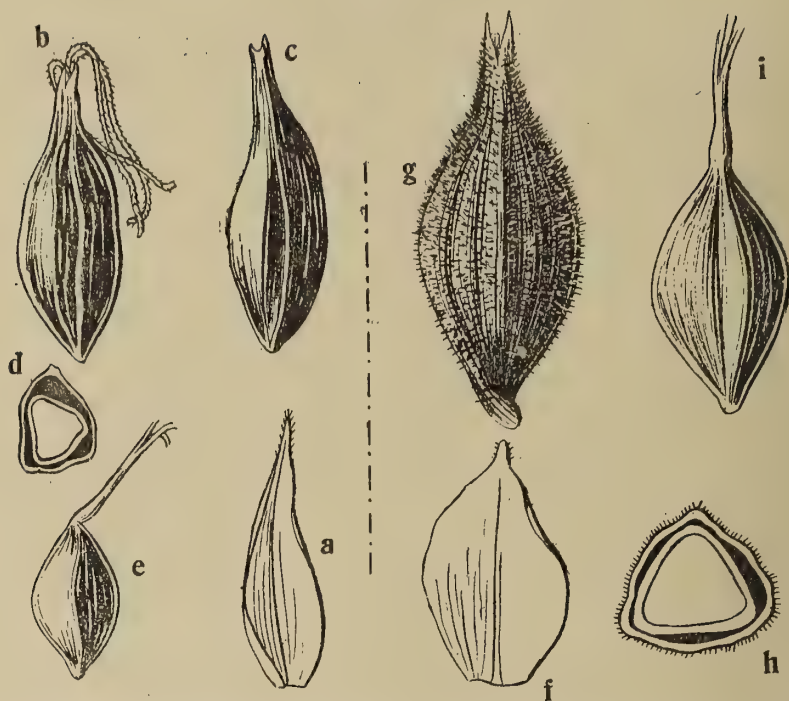


Fig. 42, a-e, *Carex Sasakii* HAYATA; a, a glume; b, an utricle; c, the same, seen from side; d, section of the same; e, a nutlet. f-i, *Carex hebecarpa* C. A. MEX. var. *ligulata* Kük.; f, a glume; g, an utricle; h, section of the same; i, a nutlet.



Fig. 43, *Carex pumila* THUNB. $\times 6$; a, a glume; b, an utricle; c, section of the same; d, a nutlet.

Sect. *Hirtæ*.

Carex hebecarpa C. A. MEY var. **ligulata** (Nees) KÜKENTHAL (Fig. 42, f-i), Cyperaceæ-Caricoideæ p. 745; MATSUM. Ind. Pl. Jap. II.-1 p. 113.

HAB. Musha: Sakuragamine, ad 8000 ped. alt., leg. R. PRICE, Oct. 1912.

Agrees pretty well with the specimens so labelled in the herbarium at Tōkyō.

Section uncertain.

Carex reflexistyla HAYATA (Fig. 44); Mater. Fl. Formos. p. 393.

Carex Dunni HAYATA Mater. Fl. Formos. p. 382.

Carex tatsutakensis HAYATA sp. nov. (Fig. 45). Densissime caespitosa, rhizomatibus brevissimis haud repentibus, radicibus fibrosis rigidissimis. Caules semper quasingemini basi foliis 3-4 suffulti, 4-10 cm. longi foliis breviores, alter longior, alter multo brevior; caulis longior apice spiculam masculinam terminalem singulam et spiculas foemineas duas laterales gerens; caulis brevior spicula foeminea singula terminatus; caulis haud

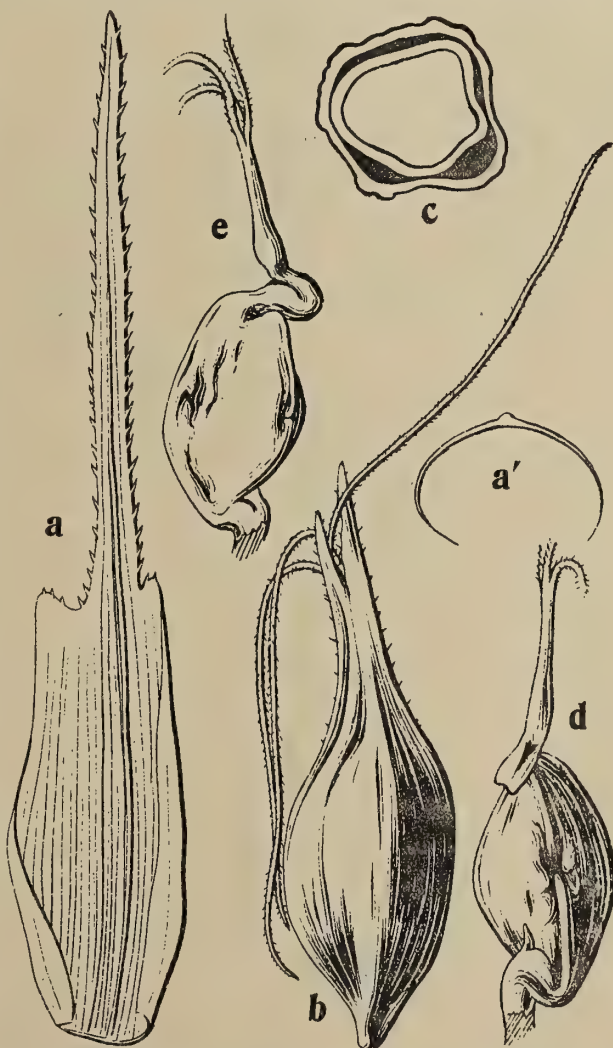


Fig. 44, *Carex reflexistyla* HAYATA $\times 12$; a, a glume; a', section of the same; b, an utricle; c, section of the same; d, a nutlet; e, the same, seen from another side.

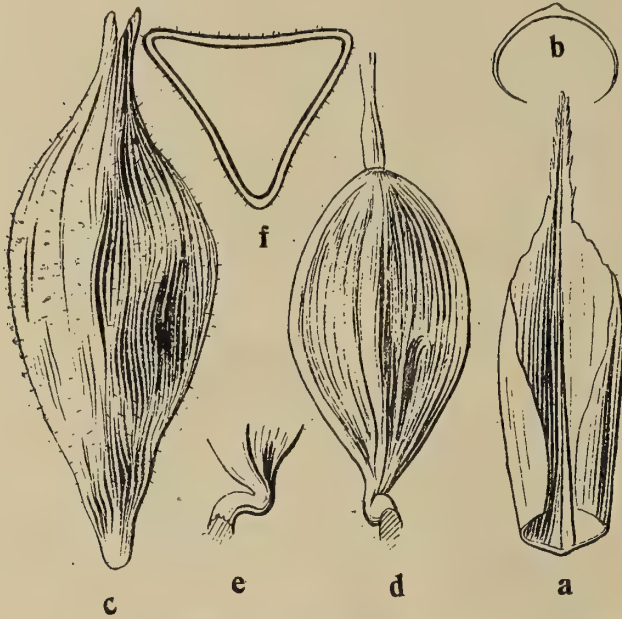


Fig 45, *Carex tatsutakensis* HAYATA $\times 12$; a, a glume; b, section of the same; c, an utricle; d, a nutlet; e, stipe of the same; f, section of the same.

ramosus, foliis caulinis nullis; bracteis basi spiculæ insitis (sed spicula fœminea terminalis caulis brevioris haud bracteata), bracteis inferioribus longioribus 7–8 cm. longis spiculas 5–6-plo superantibus, foliiformibus; bracteis basi spiculæ masculinæ insitis setæformibus brevioribus spiculas in longitudine æquantibus. Folia tenuiter coriacea 4–5-fasciculata, fasciculis basi squamis ovatis fuscentibus 3–4 instructis, foliis interioribus longioribus cum vaginis 16 cm. longis cauli longioribus, vaginis plus minus purpureis tubuliformibus 2–3 cm. longis $1\frac{1}{2}$ mm. latis latere uno fissis vel haud fissis glabris ore obliquis, ligulis brevissimis lamelliformibus integris haud ciliatis, laminis linearibus 10–13 cm. longis $1\frac{1}{2}$ mm. latis acuminatis margine sub lente scabriusculis supra sub lente vix scabriusculis subtus glabris. Spiculæ in cauli longiore circ. 3 versus apicem caulis approximativè dispositæ; terminalis masculina; lateralibus fœmineis; spicula in caule longiore masculina terminalis cylindrica erecta 1 cm. longa, bracteolis obsoletis, squamis totis fertilibus quam squama spiculæ fœminæ longioribus; spicula fœminea lateralis pedicellata, pedicellis 3–5 mm. longis complanatis latere hirsutis erectis ad basin bracteis singulis et bracteolis singulis instructis; bracteis foliiformibus inferioribus longissimis 8 cm. longis quam spicula multo longioribus, superioribus 2–3 cm. longis; bracteolis ad basin pedicelli singulariter sitis paleiformibus linearibus $2\frac{1}{2}$ mm. longis $\frac{1}{2}$ mm. latis apice truncatis hyalinis ecoloratis basin pedicelli semiamplectantibus; squamis (glumis) spiculæ fœminæ totis fertilibus mediis elongato-

ramosus, foliis caulinis nullis; bracteis basi spiculæ insitis (sed spicula fœminea terminalis caulis brevioris haud bracteata), bracteis inferioribus longioribus 7–8 cm. longis spiculas 5–6-plo superantibus, foliiformibus; bracteis basi spiculæ masculinæ insitis setæformibus brevioribus spiculas in longitudine æquantibus. Folia tenuiter coriacea 4–5-fasciculata, fasciculis basi squamis ovatis fuscentibus 3–4 instructis, foliis interioribus longioribus cum

oblongis 4 mm. longis 2 mm. latis apice acutis basi haud contractis rhachin spiculæ complete amplexantibus dorso prominente carinatis, carinis apice ad setulam 1-2 mm. scabram abeuntibus. Utriculus obovoideo-fusiformis $5\frac{1}{2}$ -6 mm. longus 2 mm. latus trigonus facie concavus apice subito attenuatus ad summum breve bi-dentatus basi gradatim acuminatus brevissime hirsutus, pilis $\frac{1}{10}$ mm. longis transverse patentibus. Nucula obovoidea trigona facie concava ad angulos prominente carinata apice obtusa basi triangulari-acuta stipitata, stipite $1\frac{1}{3}$ mm. longo cum utriculo fere perfecte connato apice libero et geniculatim recurvo, stylo basi leviter incrassato medio sursum 3-fido, ramis gracilibus crispato-recurvis.

HAB. Musha: Tatsutaka, ad 7000 ped. alt., leg. W. R. PRICE, No. 797.

The culms of this new species appear to be always in pair which are supported by a single fascicle of leaves at their base; but in reality, they are not in pair. That they appear to be in pair, is due to the fact that a single culm bears a single branch at its very base.

Carex Morii HAYATA sp. nov.

(Fig. 46). Folia radicalia ignota. Caulis erectus circ. 80 cm. longus acute triqueter gracillimus 1-1½ mm. latus glaber. Folia caulina inferiora a se 15-30 cm. distantia linearia cum vaginis 25 cm. longa, vaginis atro-purpureis 2-4 cm. longis nitidis triquetris prismaticis 3-4 mm. latis ore obliquissimis apice gradatim ad limanum abeuntibus, laminis planis circ. 20 cm. longis 4½ mm. latis apice acuminatis coriaceis margine integris scabris facie scabris; folia caulina basi ramos 1-2 amplexantibus, ramis gracillimis erectis. Spiculæ ad apicem caulis vel ramorum laxè paniculatim dispositæ, paniculis in circumscriptione linearibus circ. 25 cm. longis 4 cm. latis,

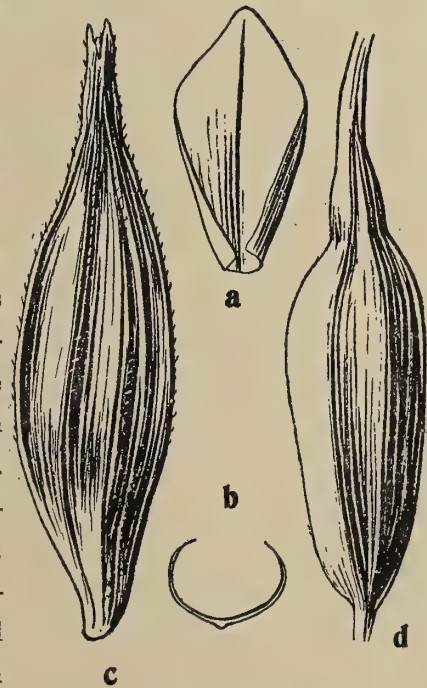


Fig. 46, *Carex Morii* HAYATA $\times 12$; a, a scale; b, the same in section; c, an utricle; d, a nutlet.

pedicellis spiculæ gracillimis $\frac{1}{2}$ –2 cm. longis, bracteis sub ramo sitis castaneo-coloratis vaginiformibus 1–1 $\frac{1}{2}$ cm. longis apice setæformibus. Spiculæ inferiores bisexuales, superiores masculinæ; spicula masculina linear-cylindrica plus minus recurva 2–3 cm. longa 1 $\frac{1}{2}$ mm. lata apice acuminata basi obtusa, squamis inferioribus sterilibus; squamis mediis ovatis 4 $\frac{1}{2}$ mm. longis 2 mm. latis apice acutis; stamina 3, filamentis glabris, antheris linearibus 2 mm. longis $\frac{1}{6}$ mm. latis apice ad connectivum brevissime productis, partibus productis subacutis, basi auriculis brevissimis; spiculæ bisexuales obovatæ brevissime pedicellatæ 5 mm. latæ pauci-floratæ; fl. ♀ medii: squamis (glumis) ovatis 3 $\frac{1}{2}$ –4 mm. longis 2 mm. latis utriculo brevioribus apice acutis obtusis vel cuspidatis margine integris basi perfecte rhachin utriculi amplexantibus glabris dorso 1-costatis. Utriculus fusiformis 6 $\frac{1}{2}$ mm. longus 1 $\frac{1}{2}$ mm. latus apice rostrato-attenuatus ad summum 2-dentatus basi breve attenuatus dorso convexus facie concavus utraque hirsutus tenuiter multo striatus. Nucula elongato-obovoideo-elliptica 3 $\frac{1}{2}$ –4 mm. longa 1 $\frac{1}{2}$ mm. lata lævis dorso convexa facie plana apice abrupte rostrata ad stylum abeuns.

HAB. Formosa, loco non indicato, leg. U. MORI, 1912.

Gramineæ.

Arundinaria MICH.

***Arundinaria Kunishii* HAYATA** sp. nov. (Fig. 47). Frutex. Rhizoma repens circ. 40 cm. longum 1 $\frac{1}{2}$ cm. in diametro plus minus recurvum, internodiis 2–2 $\frac{1}{2}$ cm. longis, squamis complete obtectum, squamis stramineis glabris 5 cm. longis apice triangulari-obtusis interdum 2-fidis complete rhizoma amplexantibus. Turio erectus rectus e rhizomate lateraliter oriundus deorsum purpurascens sursum viridescens sparse hirsutus nitidus. Culmus

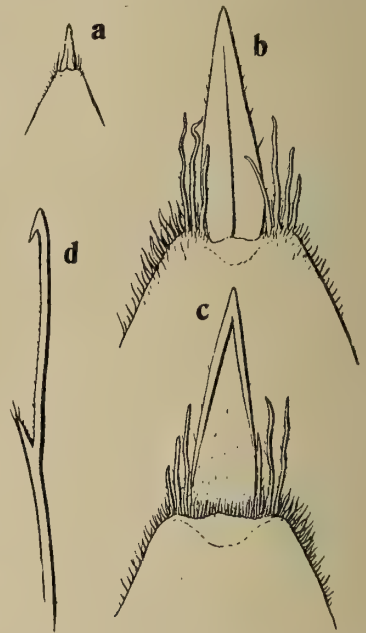


Fig. 47, *Arundinaria Kunishii* HAYATA; a, an apical portion, a sheath of turion; b, the same, magnified seen from surface; c, the same, seen from back; d, the same, in vertical section; a, natural size; others magnified.

erectus rectus 6 m. altus, 2 cm. in diametro; vagina decidua purpurea apice attenuata primum ad summum truncata sparse hirsuta demum glabra nitida margine ciliata apice utroque latere auriculis minutis et setis auricularibus instructa, pseudophyllis lineari-triangularibus 5 mm. longis 4 mm. latis apice acuminatis, ligula brevissima villosa; merithallium nitidum medium 25 cm. longum 9 mm. latum; lignum $1\frac{1}{2}$ mm. crassum; canalis $5\frac{1}{2}$ mm. in diametro; pulvillus inferior prominente annuliformis, pulvillus superior tenuiter elevatus, pulvilli a se 7 mm. distantes; squama bicarinata bifida subglabra. Rami ternatim siti simplices vel pauciramulosi, ramulis 3-5-10-foliatis; vaginella valde imbricata 5-10 cm. longa complanata ore truncata, setis auricularibus utroque latere circ. 10 erectis rectis vel crispatis; ligula brevissima hirsuta. Folia lineari-lanceolata 15-24 cm. longa 2- $3\frac{1}{2}$ cm. lata apice subito acuminatissima basi abrupte ad petiolum 5-7 mm. longum abeuntia margine sursum latere uno hirsuta latere uno scabra, nerviis secundariis utroque latere costæ 7-11, venulis inter nervos secundarios 7.

HAB. Nantō: Rinkiho et Rōsuikō, Aprili. 1916, leg. B. HAYATA; Kagi: Shōkoshō, culmus 10 m. altus $2\frac{1}{2}$ cm. in diametro.

Near *Arundinaria japonica*, but differs from it in having ternate branches, and in having shining vaginas of the turions. The vaginas of *A. japonica* is quite lusterless.

Arundinaria niitakayamensis HAYATA in Tōkyō Bot. Mag. XXI. p. 49 et Fl. Mont. Formos. p. 240.

Sasa niitakayamensis CAMUS *Bambus*. (1913) p. 24.

In our species, the stamens are usually in three, and the branches are always ternate,—characters quite assignable to *Arundinaria*, but not to *Sasa*. As Monsieur CAMUS gave no comment, I can not understand on what ground did he transfer this species to *Sasa*.

Arundinaria oiwakensis HAYATA sp. nov. (Fig. 48). Frutescens. Rhizoma horizontaliter sympodialiterque repens, partibus novellis squamis imbricatis obtectis, 5 mm. crassum, radicibus teretibus incrassatis 4 mm. in diametro. Turio erectus rectus purpurascens hirsutus multistriatus, striis viridescentibus, pilis albis vel fulvescentibus caducissimis obtectus; vaginæ mediæ turionis subcoriaceæ caducæ dorso hirsutæ instus glabræ nitidæ basi ad insertionem dense

villosa-hirsutæ margine ciliolatæ; pseudophyllis minutis linearibus vel triangulari-linearibus 7-8 mm.-25 mm. longis basi $1\frac{1}{2}$ mm. latis extus glabris intus basi hirsutis semper deflexis intus canaliculatis; auriculis nullis; ligula lineari-triangularis erecta recta apice fimbriato-ciliata cum ciliis 5-10 mm. longa, ciliis validis 3-4 mm. longis erectis subrectis sub lente hirsuto-scabridis. Culmus distante situs rectus erectus 300 cm.-440 cm altus, parte inferiore non ramifera 130 cm.-140 cm longa 9 mm. in diametro, teres haud striatus; merithallium inferius 23 cm. longum 8 mm. in diametro. lignum 2 mm. crassum; canalis medullaris 3 mm. in diametro; inferior pulvillus infundibulari-prominens elevatus, superior pulvillus leviter elevatus, pulvilli a se 4-5 mm. distantes; squama bicarinata usque ad basin æqualiter bifida 2 cm. longa ad carinas hirsuta cæterum glabra. Rami multo-fasciculati 60 cm. longi haud solidi foliiferi; ramuli tenuissimi 3-5-foliiferi. Folia lineari-lanceolata 8-15 cm. longa $1-1\frac{1}{2}$ cm. lata apice acuminata acuminatissima basi triangulari-cuneata ad petiolum brevissimum abeuntia margine scabra, nervis secundariis 2-3-pariis, nervulis 8 inter secundarios; vaginella 4-6 cm. longa, setæ auriculares 8-10 erectis rectis scabris; ligula oblonga $1\frac{1}{2}$ mm. longa obtusissima hirsuta. Inflorescentia cum ramis foliiferis intermixta ad apicem ramuli terminalis. Spiculæ 7-10 laxè paniculatim dispositæ longe pedicellatæ. Spicula matura non visa.

HAB. Musha-Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 23, 1916.

Very near *A. niitakayamensis* HAY., perhaps a form of the latter.

Arundinaria Usawai HAYATA sp. nov. (Fig. 49). Rhizoma longe repens lateraliter turiones gerens 8 mm. in diametro. Turio erectus rectus

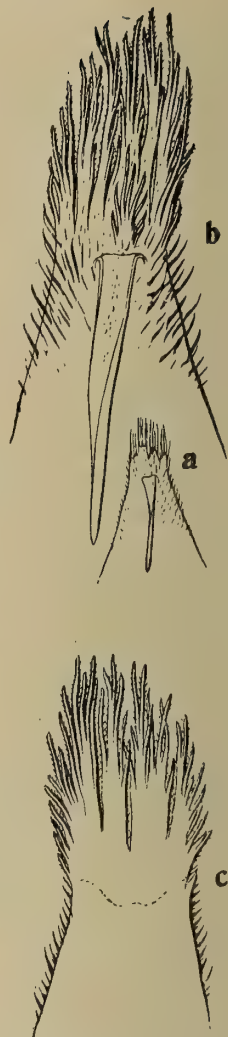


Fig. 48, *Arundinaria oiwakensis* HAYATA; a, a sheath of a turion; b, the same, seen from surface; c, the same, seen from back; a, natural size; others magnified.

purpurascens haud nitidus opacus; vagina media purpurascens opaca haud nitida scabra pilis brevissimis fusco-purpureis triangulari-formibus adpresse conspersa margine sursum ciliolata; setæ auriculares utroque latere apicis vaginæ 4-5 sitæ rectæ erectæ hirsutæ; ligula brevissime hirsuta; pseudophyllis minutis longe triangularibus 4 mm. longis $1\frac{1}{2}$ mm. latis apice acuminatis. Culmus distans 3 m. altus prope basin $1-1\frac{1}{2}$ cm. in diametro toto vaginis persistentibus obtectus, partibus non ramiferis 110 cm. longis; merithallium inferius 25 cm. longum 14 mm. in diametro, pulvillis a se 7 mm. distantibus, pulvillis inferioribus prominente

annuliformibus, pulvillis superioribus haud vel vix prominentibus; lignum 3 mm. crassum; canalis medullaris 7 mm. in diametro; squama bicarinata 2-fida, segmentis linearibus 15 mm. longis ad carinas hirsutis. Rami ternati vaginati, centrale majore, laterales minores. Ramuli vaginati vel interdum nudi 1-2-foliati; vaginella circ. 5 cm. longa glabra apice utroque latere auriculis minutis et setis auricularibus instructa, ligula minuta fimbriata hirsuta. Folia lineari-lanceolata 11-31 cm. longa 13-43 mm. lata apice acuminatissima basi plus minus oblique obtusa ad extremitatem subito cuneata ad petiolum 2-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere costæ 5-8, nervulis inter secundarios 7-10.

HAB. Shishitao ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916. typus!.

Near *A. japonica*, but differs from it by the ternate branches on the culms and by the not hairy scabrous lusterless persistent sheaths.

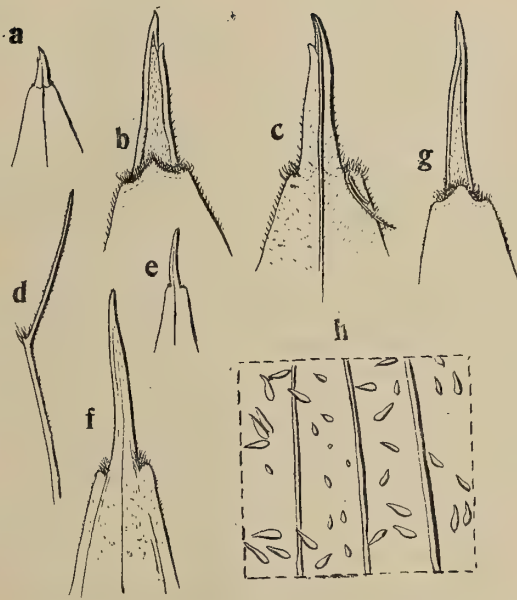


Fig. 49, *Arundinaria Usawai* HAYATA; a, a sheath of a turio; b, the same seen from back; c, the same seen from surface; d, vertical section of the same; e, another sheath; f, the same seen from surface; g, the same, seen from back; h, hairs on the surface; a and e, natural size; others more or less magnified.

Phyllostachys SIEB. et ZUCC.

Phyllostachys pubescens H. LEHAIE Nat. Syst. Bamb. in Act. III. Congr. Int. Bot. p. 233 tt. 55-57.

Phyllostachys mitis RIV.; MATSUM. Ind. Pl. Jap. II-1 p. 94.

HAB. Rōsuikō, cult., leg. B. HAYATA, Aprili. 1916.

Note:—Rhizome repens, culms distant, erect, side branches single or in pairs.

Phyllostachys formosana HAYATA sp. nov. (Fig. 50). Arborescens vel frutex. Rhizoma repens; turio purpurascens plus minus maculatus glaber, vagina medio margine laud ciliolata glabra tenuiter membranacea apice abrupte ad pseudophyllum abeuns truncata, partibus truncatis 1 cm. latis, apice hand auriculata setulis auricularibus nullis; ligula subnulla; pseudophyllum



Fig. 50, *Phyllostachys formosana* HAYATA; a, apical portion of a sheath of a turion, seen from surface; b, the same, seen from back; c, vertical section of the same; natural size.

lineare 16 cm. longum 3 mm. latum apice acuminatum margine undulatum et interiore recurvum. Culmus distans 7 m. longus a basi usque ad 2 m. altitudinem $3\frac{1}{2}$ cm. in diametro, rotundatus in sectione, canalis $2\frac{1}{2}$ cm. in diametro; lignum $\frac{1}{2}$ cm. crassum; merithallium in 2 m. altitudinem mediocriter 10 cm. longum valde variabile interdum irregulare ut *Bambusa heteroclada*; pulvillus inferior distincte elevatus annuliformis, pulvillus superior tenuissime elevatus a iis inferioribus 3 mm. distans; merithallium ramiferum in sectione \cap -forme, ramis solitariis vel geminis. Ramuli graciles 1-2-foliati; vaginella 3 cm. longa 1 mm. lata latere convoluto-imbricata latere sursum ciliolata apice pubescens, auriculis inaequalibus, una majore una minore, semi-rotundatis hirsutis, ligula minuta hirsuta, setis auricularibus non existis. Folia lanceolata vel lineari-lanceolata 8-12 cm. longa 17 mm. lata apice acuminata basi obtusa ad petiolum 3-5 mm. longum abeuntia margine scabra, nervis secundariis utroque latere

costæ 4-5, venulis inter secundarios 7.

HAB. Rinkiho: Daikōshō, leg. B. HAYATA, Aprili. 2, 1916.

Near *P. aurea*, but differs from it by the turions with purple maculated vaginæ and in the absence of the auricular setæ.

Phyllostachys lithophila HAYATA sp. nov. (Fig. 51). Arborescens. Rhizoma horizontaliter longe repens teres $2\frac{1}{2}$ cm. in diametro. Turion glaber fulvo-purpurascens plus minus maculatus striatus, squama media apice obtusa vel acuta, partibus apicaribus cum pseudophyllo æquilatis, apice margine hirsuta; ligula brevissima $\frac{1}{2}$ mm. longa apice truncata hirsuta; pseudophyllum triangulari-lineare in specimine nostro 8 mm. longum 3 mm. latum basi gradatim latius haud contractum utraque glabrum, partibus basilaribus carnosius intus hirsutis. Culmus minutissime striatus distans erectus rectus 15 m. altus. Merithallium in 2 m. altitudine $4\frac{1}{2}$ cm. in diametro perfecte circulare in sectione; lignum 6-7 mm. crassum; canalis medullaris 3 cm. in diametro; pulvillus inferior acute tenuiter elevatus, pulvillus superior obscure tenuissime elevatus, vulvillis a se 4 mm. distantibus. Rami gemini vel solitarii; ramuli 1-3-foliati,

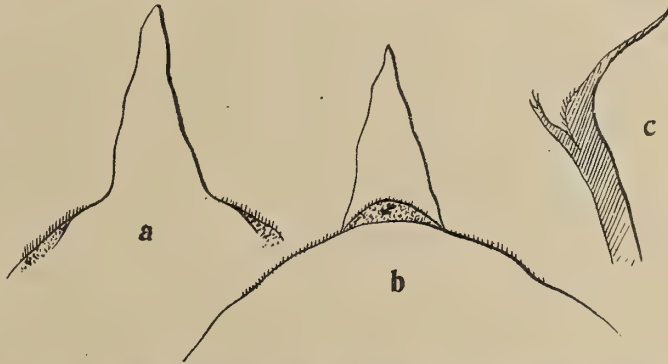


Fig. 51, *Phyllostachys lithophila* HAYATA; a, an apical portion of a sheath of a turion; b, the same, seen from within; c, the same in vertical section; all figures magnified.

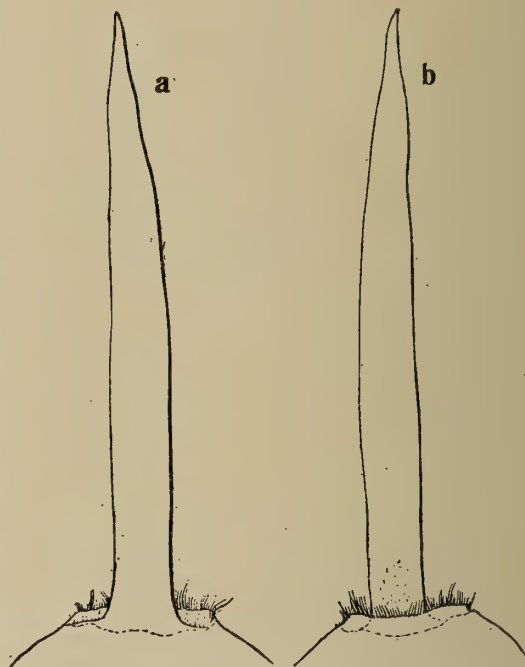
vaginella 3-4 cm. longa apice hirsuta, setis auricularibus paucissimis generaliter obsoletis nullis; ligula membranacea cylindrica 2 mm. longa uno latere fissa hirsuta. Folia lineari-lanceolata 10-20 cm. lata apice acuminatissima basi rotundata vel cuneata ad petiolum 2-7 mm. longum abeuntia supra glabra subtus basi hirsuta cæterum glabra, margine uno lævi, uno scabro, nervis secundariis utroque latere costæ 5-6, venulis inter secundarios 9-10.

HAB. Rinkiho: Chōrin, leg. B. HAYATA, Aprili. 1916.

Near *P. Makinoi* HAYATA, but differs from it in having vaginæ passing

to the pseudophylla which are very much smaller than those of *P. Makinoi* and in the absence of the auricular setæ in the leaves. Turions of this new species are much paler than those of *P. Makinoi*.

Phyllostachys Makinoi HAYATA (Fig. 52) Ic. Pl. Formos. V. p. 250. Descriptio aucta: Arborescens. Rhizoma repens teres vel complanatum 2 cm. in diametro. Turio fusco-purpureo-purascens; vagina purpureo-maculata apice obtusa subito truncata, partibus truncatis quam basi pseudophylli duplo latioribus, apice haud auriculata haud setosa; ligula lata quam pseudophyllum duplo latior, extus pubescens intus glabra nitida apice truncata in specimine nostro 20–7 mm. lata 2 mm. longa; pseudophyllum lineari angustum in specimine nostro 2–8 cm. longum $3\frac{1}{2}$ –8 mm. latum apice acuminatum basi latissimum supra basin subito contractum glabrum. Culmus rectus erectus 15 m. altus.



HAB. Rinkihō: Rōsuikō, leg. B. HAYATA, Aprili. 2, 1916. Fig. 52, *Phyllostachys Makinoi* HAYATA; a, a sheath of a turion, seen from without; b, the same, seen from within; natural size.

Phyllostachys nigripes HAYATA sp. nov. (Fig. 53). Rhizoma repens teres 6 mm. in diametro fuscens. Turio deorsum purpureo-purascens sursum viridis glaber; vagina media in specimine nostro 4 cm. longa $1\frac{1}{2}$ cm. lata apice membranaceo-coriacea apice obtuso-truncata quam basis pseudophylli latior margine ciliolata, auriculis nullis; ligula $\frac{2}{3}$ mm. longa intus glabra extus hirsuta apice truncata hirsuta. Pseudophyllum lineari-triangulari 9 mm. longum $2\frac{1}{2}$ mm. latum. Culmus gracilis fusco-purpureo-purascens 100 cm. altus. Merithallium medium 13 cm. longum $4\frac{1}{2}$ mm. in diametro in sectione \bigcirc forme uno latere sulcatum; pulvillus inferior annulariter prominens, is superior plus acute prominens a

eo inferiore $1\frac{1}{2}$ mm. distans, nodiis valde prominentibus; squama bicarinata longe linearis 2-3 cm. longa 1-2 mm. longa extus hirsuta. Rami generaliter gemini; ramuli 3-foliati; vaginella $2\frac{1}{2}$ cm. longa glabra, setis auricularibus utroque latere apicis 4-5 circ. 6 mm. longis; ligula obtusa 1 mm. longa obtuso-truncata extus hirsuta intus glabra apice eroso-ciliolata. Folia lineari-lanceolata 8-9 cm. longa 11-14 mm. lata apice acuminatissima basi obtusa ad petiolum 4-7 mm. longum abeuntia supra glabra subtus prope basin costæ hirsuta cæterum glabra margine uno latere scabra uno latere glabra, nervis secundariis utroque latere 4-5, venulis inter secundarios 9-10.

HAB. Rōsuikō: Yūshakō, leg. B. HAYATA, April. 5, 1916.

Near *P. puberula* var. *nigra*, but distinguishable from it in having quite glabrous turions.

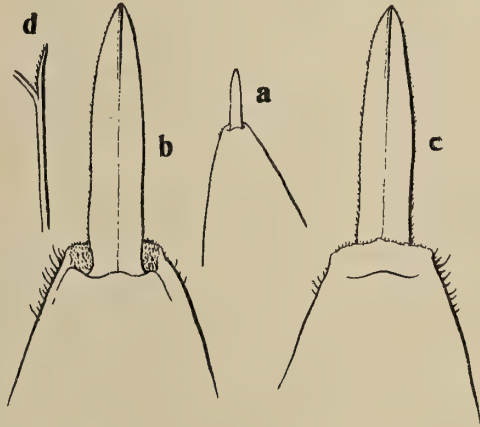


Fig. 53, *Phyllostachys nigripes* HAYATA; a, a sheath of a turion seen from surface; b, the same; c, the same, seen from within; d, the same, in vertical section, showing the ligule; a, natural size; others magnified.

Bambusa SCHREM.

Bambusa breviflora MUNRO Monograph p. 96; CAMUS *Bambus*. (1913) p. 118. "Chaume inerme, arborescent? presque plein, dur, brillant, entre-noeuds longs de 13-16 cm.; rameaux fasciculés aux noeuds, les inférieurs noueux à la base, arrondis, simples ou rameux, florifères au sommet, souvent feuillés à la base, mais à feuilles promptement caduques, rameaux du sommet souvent feuillés, mêlés à d'autres florifères nus à la base. Feuilles lancéolées, longues de 4-10 cm. larges de 12-18 mm. arrondies à la base, à pétiole court comprimé, acuminées-sétacées au sommet, à bords rudes à peine dentés, glabrescentes en dessus, hirsutes en dessous, munies de 4-5 paires de nervures latérales visible et d'autres intermédiaires beaucoup [plus faibles; gaines sillonnées, glabres, auriculées, à oreilles ciliées ou parfois longuement fimbriées (18 mm.) Panicule

sur des rameaux ou ramusculs terminaux, en épis verticillés, à verticilles formés de peu d'épillets et à peu près équidistants. Epillets brillants livides, courts, au plus de 14 mm. de long, pauciflores, à 5-7-fl., subcylindriques, aigus; rachéole courte, articulée. Fleurs supérieures et inférieures graduellement imparfaites, les moyennes 2-3 hermaphrodites. Fleurs ♂: Glumelle infér. nerviée, glabre, obtuse, souvent mucronée; glumelle supér. dépassant un peu la sup. 2-carénée, à carènes finement fimbriées vers leur sommet, munie de 5-7 nervures entre les 2 carènes. Glumellules non visiblement nerviées, finement fimbriées. Anthères à connectif obtus allongé. Style surmonté par 3 stigmates. Ovaire stipité, obové, hirsuté au sommet. Chine, Formose: Tamsuy (OLDHAM), Linthao (CANTRO)."

HAB. Mt. Kwannonzan.

Bambusa dolichoclada HAYATA sp. nov. (Fig. 54). Rhizoma breve erectum crassum teres $4\frac{1}{2}$ cm. in diametro. Culmus haud spinosus breve caespitosus 10 cm. altus in 2 m. altitudinem $4\frac{1}{2}$ cm. in diametro teres circularis in sectione viridis saepe extus albo-cerifer a basi ramifer; ramis inferioribus efoliatis gracillimis longissimis horizontaliter patentibus. Merithallium ad 2m. altitudinem 30 cm. longum $4\frac{1}{2}$ cm. in diametro, lignum 8 mm. crassum, canal 33 mm. in diametro, pulvillus inferior prominens, is superior obscurus; pulvilli a se 7 mm. distantes. Rami ad nodos fasciculati. Vagina media coriacea extus fusco-hirsuta 24 cm. longa 28 cm. lata margine versus apicem tenuiter hirsuta apice late truncata, partibus truncatis 16 cm. latis plus minus rotundatis vel fere truncatis; ligula brevissima apice fimbriato-ciliata; pseudophyllum elongato-triangulare 17 cm. longum 16 cm. latum, basi cum partibus truncatis vaginæ æquilatum, basi subito latius supra basin ad marginem valde undulato-crispato-plicatum hic ibidem longe setoso-barbatum extus subglabrum intus basi dense hirsuto-barbatum; vaginella $5\frac{1}{2}$ -7 cm. longa 2-3 mm. lata glabra apice auriculis conspicuis setulosis utroque latere instructa, ligula brevissima truncata extus hirsuta $\frac{1}{2}$ mm. longa haud ciliolata. Folia lineari-lanceolata 9-18 cm. longa 13-23 mm. lata apice acuminatissima basi subito rotundato-truncata abrupte ad petiolum $1\frac{1}{2}$ -2 mm. longum abeuntia margine scabra supra glabra supra prope latus unum scabra subtus tenuiter hirsuta, nervis secundariis utroque latere costæ 5-7, venulis inter secundarios 8-9 haud tessellatis.



Fig. 54, *Bambusa dolichoclada* HAYATA; a, apical portion of a sheath of a turion, seen from without; b, another portion of the same; c, the same, seen from within; d, the same, in vertical section; all figures natural size.

HAB. Rinkiho: Aprili. 1916, B. HAYATA.

Near *B. stenostachys* HACK., but distinguishable from it by the much larger leaves, and in the unarmed branches and thinly ceriferous culms. The

flowers of this species are much larger than those of *B. stenostachys* HACK.

***Bambusa dolichomerithalla* HAYATA** sp. nov. (Fig. 55). Frutex.



Fig. 55, *Bambusa dolichomerithalla* HAYATA; a, a portion of an inflorescence; b, a flower; c, a glume of the same flower, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; g, an apical portion of the same; h, a valva, seen from the outer side; i, the same, seen from the inner side; j, cross section of the same; k, an apical portion of the same; l, m, stamens; n, o, apical portions of the different stamens; p, a lodicule; q, an ovary; r, basal portion of a vagina; s, longitudinal section of the same; a, natural size b, c, d, e, h, i, $\times 2$; l, m $\times 3$; p, $\times 6$.

Rhizoma teres 3 cm. in diametro, internodiis 7–15 mm. longis, erectum crassum breve. Culmus erectus rectus cæspitosus in 2 m. altitudinem $4\frac{1}{2}$ cm. in diametro 10 m. altus cum ramis ramulisque perfecte teres, partibus non ramiferis 6 m. longis. Merithallium medium vel inferius 25–60 cm. longum $2\frac{1}{2}$ in diametro viride vel albo-striatum, pulvillus inferior tenuiter elevatus duplicato-annulariformis, pulvillus superior obscurrimus haud elevatus a eo inferiore 1 cm. distans; lignum $2\frac{1}{2}$ mm. crassum; canalis 2 cm. in diametro. Vagina coriacea 10 cm. longa 7 cm. lata apice late rotundata cum pseudophyllo juncta sparse hirsuta, pilis deciduis; pseudophyllo sub-membranaceo oblongo-triangulari 11 cm. longo 6 cm. lato apice acuminato basi plus minus contracto; ligula subnulla haud hirsuta. Rami ad nodos dense fasciculati, ramulis elongatis 5–8-foliatis, vaginella $3\frac{1}{2}$ – $7\frac{1}{2}$ cm. longa $1\frac{1}{2}$ – $2\frac{1}{2}$ mm. lata, auriculis interdum conspicue evolutis interdum haud evolutis, setis auricularibus interdum evolutis interdum haud visis, ligula brevissima truncata interdum crenulata. Folia lineari-lanceolata 9–27 cm. longa 1–3 cm. lata apice acuminata basi rotundata cuneata, ad petiolum 1–2 mm. longum abeuntia supra glabra subtus hirsuta vel subglabra, nervis secundariis utroque latere costæ 3–7, venulis inter secundarios 4–8. Inflorescentia cum foliis interdum intermixta vel interdum haud mixta. Rami floriferes simplices haud ramosi, inferiores 1 m. longi. Spiculæ ad nodos solitariæ alternæ sessiles bractea singula caducissima involutæ lineari-lanceolatæ complanatæ 5–6 cm. longæ 1 cm. latæ pallido-virides glabræ nitidæ teretes 7–8-floratæ. Glumæ inferiores non floriferæ; valva (=gluma florifera) floris medii ovato-oblonga 2 cm. longa 11 mm. lata apice acuta convoluta utraque glabra. Palea plicata in plicato lineari-lanceolata apice acuminata in summo obtusa ciliata 2-carinata ad carinam setuloso-ciliolata extus glabra intus minute hirsuta secus carinam plicata, partibus plicatis medio 3 mm. latis, margine sursum minute ciliolata. Stamina 6, antheris pendulis linearibus 12 mm. longis apice attenuatis ad summum emarginatis basi sagittato-2-lobatis, lobis 1 mm. longis; lodiculis 3 obovato-cuneatis hyalinis nervosis apice triangulari-acutis erosus haud fimbriatis. Ovarium obovoideum stipitatum cum stipite 2–3 mm. longum $1\frac{1}{2}$ mm. latum patento-hirsutum, stigmatibus 3 filiformibus hirsutis.

HAB. Yûsuikō, ad 3000 ped. alt., leg. B. HAYATA, Aprili. 1916; (sp. fl. et fol.); Rōshinkōshō: Kwaiyōzan, leg. B. HAYATA, Aprili. 1916. Culmus

7 m. altus ad 2 m. altitudinem $3\frac{1}{2}$ cm. in diametro.

Near *Bambusa vulgaris*, but differs from it by the nearly solitary and much longer spikelets. Also near *B. nana* var. *normalis*, but distinguishable from it by the much longer, internodes, spikelets and leaves.

Bambusa Fauriei HACKEL (Fig. 56); MATSUM. et HAYATA Enum. Pl. Formos. p. 549.

Bambusa liukiensis HAYATA sp. nov.
Frutex. Rami graciles, ramulis 3-5-foliatis, vaginella 2-3 cm. longa glabra apice auriculata, auriculis oblongo-triangularibus 1 mm. longis $\frac{1}{2}$ mm. latis apice obtusis oblique prominentibus margine setosis, setis 5 mm. longis scabris, ligula brevissima $\frac{1}{2}$ mm. longa integra truncata. Folia lanceolata 5-7 cm. longa 8-11 mm. lata apice acuminatissima basi oblique rotundata vel obtusa ad petiolum 1 mm. longum abeuntia margine supra glaberrima subtus glaucissima tenuissime hirsuta margine scabra, nervis secundariis utroque latere costæ 4-5, venulis inter secundarios 7-8 haud tessellatis. Paniculæ compositæ, ramis fasciculatis, bractea ignota. Spiculæ lineari-fusiformes 2 cm. longæ ad nodos solitariæ vel 2-3-fasciculatæ sessiles, floribus perfectis 3 et eo imperfecto 1; glumæ non-florifere inferiores minutæ superiores majores; valva (gluma florifera) 12 mm. longa nervosa glabra fere convoluta acuta; palea plicata in plicato 10 cm. longo $1\frac{3}{4}$ mm. lata apice bifida, lobis acuminatis 2 mm. longis, dorso 2-carinata ad carinas hirsuta, inter carinas glabra, partibus plicatis $1\frac{1}{2}$ mm. latis. Stamina 6, antheris linearibus 6-7 mm. longis 1 mm. latis apice brevissime 2-lobatis basi sagittato-2-lobatis,

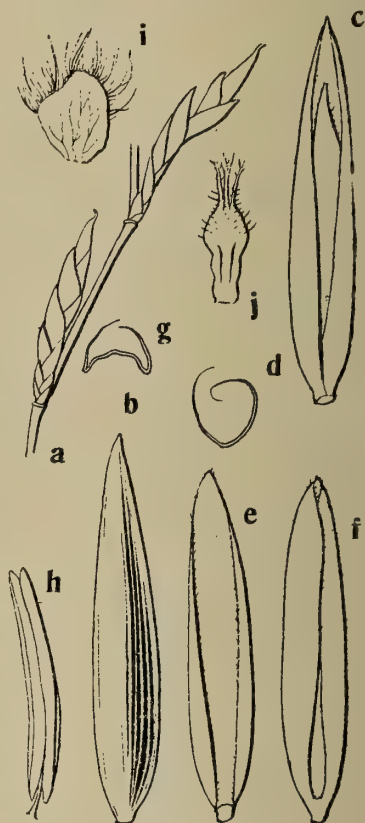


Fig. 56, *Bambusa Fauriei* HACK.
a, a portion of the inflorescence; b, a glume of a flower, seen from the outer side; c, the same, with a valva, seen from the inner side; d, cross section of the same; e, a valva, seen from the outer side; f, the same, seen from the inner side; g, the same, in cross section; h, a stamen; i, a lodicule; a, natural size; b, c, e. $\times 4$ i, $\times 6$.

lobis 1 mm. longis; lodiculæ obovatæ $2\frac{1}{2}$ mm. longæ 1 mm. latæ apice triangulari-acuminatæ fimbriatæ basi cuneatæ. Ovarium obovoideum $1\frac{1}{2}$ mm. longum 1 mm. latum apice globosum basi longe cuneatum sursum glabrum deorsum hirsutum, stigmatibus 3 filiformibus fimbriatis.

HAB. Liu-kiu, secus rivulas crescens, leg. J. MATSUMURA.



Fig. 57, *Bambusa Oldhami* MUNRO; a, a sheath of a turion, seen from the outer surface; a', basal portion of the same, seen from the inner side, showing the ligule; b, a portion of the same, in vertical section, showing the ligule; c, a portion of the inflorescence; d, a glume of a flower; e, the same, seen from the inner side; f, a palea of the same flower; g, the same, seen from the inner side; h, apical portion of the same, more magnified; i, cross section of the same valva; j, a stamen; a, b, c, natural size; others $\times 3$.

Distinctly differs from *B. nana* ROXB. in having much smaller and shorter spikelets and in having very prominent auricles at the apex of the vaginella.

Bambusa Oldhami MUNRO (Fig. 57); MATSUM. et HAYATA, Enum. Pl. Formos. p. 550. Rhizoma erectum breve crassum. Culmus cæspitosus erectus vel plus minus recurvus 12 m. altus; merithallium in $1\frac{1}{2}$ m. altitudinem 25 cm. longum $5\frac{1}{2}$ cm. in diametro; lignum 12 mm. crassum; canalis 4 cm. in diametro, pulvillus inferior tenuissime elevatus, partibus inter pulvillum inferiorem et superiorem tenuiter impressis.

HAB. Rinkihō, leg. B. HAYATA, Aprili. 1916.

Bambusa pachinensis HAYATA sp. nov. (Fig. 58). Frutex. Rhizoma crassum erectum. Culmus cæspitosus 2 m. altus. Rami fasciculati, ramulis 5-6-foliatis; vaginella $3\frac{1}{2}$ -5 cm. longa sursum marginæque hirsuta deorsum glabra, auriculis inæqualibus palmiformibus 1 mm. latis instructa, auriculis setosis, setis 5-6, 7 mm. longis haud scabris; ligula brevissima $\frac{3}{4}$ mm. longa extus hirsuta margine erosa. Folia lanceolata vel ovato-lanceolata $7\frac{1}{2}$ -10 cm. longa 18-20

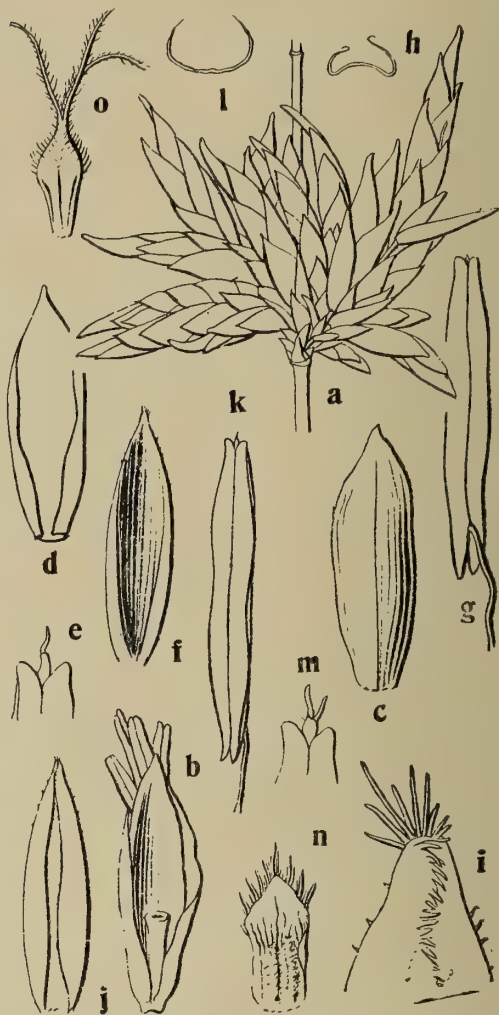


Fig. 58, *Bambusa pachinensis* HAYATA; a, a part of an inflorescence; b, a flower; c, a glume, seen from the outer side; d, the same, seen from the inner side; e, cross section of the same; f, a palea, seen from the outer side; g, the same, seen from the inner side; h, cross section of the same; i, an apical portion of the same; j, k, stamens; l, m, apical portion of different stamens; n, a lodicule; o, an ovary; a, natural size; b, c, d, e, f, g, h $\times 3$; j, k, n, o $\times 6$ others more magnified.

mm. lata apice acuminatissima basi plus minus rotundata vel leviter cordata ad petiolum $1\frac{1}{2}$ mm. longum abeuntia margine utroque scabra supra prope costam scabra supra glabra subtus tenuiter hirsuta, nervis secundariis utroque latere costæ 3-5, venulis intersecundariis 7-8 tessellatis, inter venulas pellucido-punctata. Paniculæ compositæ non foliiferæ; spicæ vel spiculæ ad nodos multi- vel pauci-congestæ, basi bractea instructæ; bractea caducissima triangulari-ovata 1 cm. longa 5 mm. lata apice lamina minutissima cuspidato-triangulari $1\frac{1}{2}$ mm. longa instructa. Spiculæ lineares complanatæ 3-4 cm. longæ 6-7 mm. latæ circ. 8-floriferæ; rhachis minute hirsuta, rhachilla glabra. Valva (gluma florifera) ovata convoluta 13 mm. longa in explicato 10 mm. lata apice acuta extus glabra intus sursum dense hirsuta deorsum glabra valde coriacea nervosa; palea plicata 13 mm. longa coriaceo-membranacea extus ad costas hirsuta cæterum glabra intus sparse hirsuta apice hirsuta. Stamina 6, antheris linearibus 6 mm. longis apice emarginatis mucronatis basi sagittato-lobatis, lobis 1 mm. longis; lodiculæ obovatæ 3 mm. longæ 2 mm. latæ apice rotundatæ margine longe fimbriato-ciliatæ. Ovarium cuneato-obovoideum 2 mm. longum 1 mm. latum apice hirsutum deorsum glabrum, stigmatibus 3 filiformibus hirsutis.

HAB. Pachina, leg. B. HAYATA, Mart. 1916.

Remarkable for the broader bracts which are almost wanting of a lamina.

Bambusa Shimadai HAYATA sp. nov. (Fig. 59). Frutex; rami et ramuli fasciculati, ramulis 5-12-foliatis, vaginella $1\frac{1}{2}$ cm. longa glabra, auriculis subnullis, setis auricularibus 5-6 tenuissimis 1-2 mm. longis; ligula brevissima truncata integra. Folia lanceolata vel lineari-lanceolata 5 cm. longa 6-9 mm. lata apice acuminatissima basi rotundata vel obtusa ad petiolum 1- $1\frac{1}{2}$ mm. longum abeuntia utraque glabra subtus glauca margine scabra, nervis secundariis utroque latere costæ 5, venulis intersecundariis circ. 7, haud tessellata. Ramuli floriferi ad nodos 2-3-congesti remote spiculiferi. Spiculæ generaliter solitariae alternæ a se circ. $2\frac{1}{2}$ cm. remotæ basi 1-bracteatae; bracteæ caducæ, vaginellis 1-2 cm. longis, laminis lanceolatis basi abrupte dilatatis cum vaginella æquilatis caducissimis utraque pagine hirsutis. Spiculæ cylindricæ plus minus complanatæ 3-4 cm. longæ 4 mm. latæ, floribus 4-5 a se 4-2 mm. distantibus; glumæ inferiores non-floriferæ minores.

Valva convoluta 2 cm. longa apice acuta utraque pagine glabra nervosa valde coriacea. Palea coriaceo-membranacea 18 mm. lata plicata in plicato lanceolata 18 mm. longa utraque pagine glabra versus apicem carinata secus carinam plicata, partibus plicatis 2 mm. latis versus apicem ad marginem ciliolatis, ad apicem 3-4-setuloso-ciliolata. Stamina 6, antheris linearibus 1 cm. longis apice obtusis emarginatis; lodiculæ 3 inæquales hyalinæ obovato-oblongæ apice acutæ vel obtusæ erosæ. Ovarium fere obovoideum apice hirsutum sessile haud stipitatum; stigmatibus 2-3?

HAB. Sekimenshō, leg. S. SHIMADA, Mart. 1911.

Bambusa stenostachys

HACK.; MATSUM. et HAYATA Enum. Pl. Formos. p. 550. Rhizoma erectum crassum. Culmus cæspitosus plus minus flexuosus ad 2 m. altitudinem 4 cm. in diametro; lignum $1\frac{1}{2}$ cm. crassum, canalis 12 mm. in diametro. Merithallium in 2 m. altitudinem 25 cm. longum $3\frac{1}{2}$ cm. in diametro; pulvillus inferior valde prominente elevatus, pulvillus superior vix elevatus, a se 7 mm. distans; culmus a basi ramosus, ramis spinescentibus.

HAB. Rinkiho, leg. B. HAYATA, Aprili. 1916.

Bambusa tuldoidea MUNRO "Monogr. p. 93;" CAMUS *Bambus*. p.

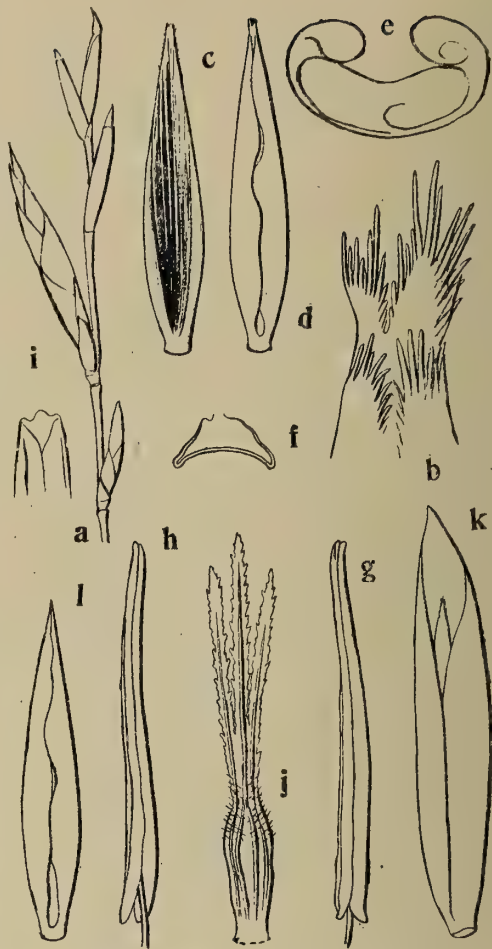


Fig. 89, *Bambusa Shimadai* HAYATA; a, a portion of an inflorescence; b, a flower; c, a palea, seen from the outer side; d, the same, seen from the inner side; d', apical portion of the same; e, cross section of a flower; f, cross section of a palea; g, h, stamens; i, an apical portion of a palea; j, an ovary; k, natural size; others more or less magnified.

117.—“Chaumes à peine arborescents, fistuleux, à rameaux feuillés, à entrenœuds sillonnés-striés. Feuilles de ces rameaux, longues de 12–20 cm. larges de 15–20 mm. lanceolées, arrondies à la base, pétiolées, à bords denticulés, à dents éloignées surtout vers la base, glabres en dessous, mais à toucher rude sur les bords, un peu poilues en dessous; nervures secondaires 6–8 paires, peu distinctes; gaines ciliées vers le sommet et munies de 2 auricules ciliées et fimbriées, feuilles de la panicule de même forme mais plus petites, atténuées à la base; à gaines non munies d'auricules fimbriées et ciliées comme les autres feuilles. Inflorescence en panicule feuillée, à rachis glabre, brillant dur, arrondi, de 6–8 mm. de diam., cette panicule lâchement composée, très rarement simple, à rameaux très inégaux subverticillés; les supérieurs 1–3, les inférieurs groupés par 5–6; entrenœuds inférieurs scabriusculés au sommet. Epillets pâles, non brillants, membraneux, cylindriques un peu comprimés plus ou moins espacés, rarement agglomérés densément, longs de 25–30 mm. 4–8-flores, la fleur inférieure et les supérieures incomplètes. Rachéole à la fin visible, brièvement hirsute à sa partie supérieure. Glumes petites, ovales-aiguës, à nervure médiane un peu forte. Fleurs ♂: Glumelle inférieure sub-obtuse au sommet, brusquement mucronée; glumelle supérieure presque aussi longue ou beaucoup plus courte que l'inf. acuminée, terminée par un fascicule de poils, à carènes brièvement ciliées au sommet. Glumellules 3, obovales, obtusiuscules, finement fimbriées. Etamines à anthères obtuses. Style très court. Stigmates 3, ténus. Ovaire stipité presque obovale, hirsute au sommet, couronné par les débres du style et des stigmates. Caryopse de 5 mm. de long; obtus, presque glabre.”

“Chine: Canton, Hongkong, Formose, Tonkin.”

There are yet two more species of Bamboos in Formosa; one is very near to a small form of *B. dolichomerithalla*, and the other is a species with leaves much like those of *B. Oldhami* and with turion-sheath much like those of *Phyllostachys edulis*.

Marattiaceæ.

Archangiopteris CHRIST et GIESENHAGEN.

Archangiopteris Somai HAYATA (Pl. XIX et fig. 60) Ic. Pl. Formos. V. p. 256. Rhizoma crassum breve horizontaliter situm subrepens reliquis stipularum et basibus stipitum approximatin obtectum, radicibus e facie inferiore rhizomatis abundanter oriundis incrassatis teretibus. Stipes circ. 50 cm. longus plus minus squamatus (squamis castaneis lanceolatis membranaceis acuminatis basi subcordatis 2-3 mm. longis) a basi ad 20 cm. altitudinem articulato-geniculatus ad hic ibidem tumido-incrassatus, basi ad extremitatem subito incrassatus in exsiccatō fusco-nigricans stipulis amplis semi-rotundatis sublignosis instructus. Frons in circumscriptione ovata herbaceo-membranacea vel herbaceo-coriacea margine deorsum recurva supra atroviridis haud nitida plus minus variegata subtus pallidissima 40 cm. longa 25 cm. lata pinnata, pinnis 4-6; pinna terminali lanceolata 30 cm. longa apice subito acuminatissima, acumine lineari basi 3-4 mm. lato, basi obtusa margine a basi usque ad prope acumen regulariter crenulata (crenulis $\frac{1}{2}$ mm. longis 1 mm. latis) ad basin acuminis dentata, (dentibus ascendentibus apice obtusis $1\frac{1}{2}$ mm. longis), utraque pagine glabra, venis lateralibus simplicibus vel a basi furcatis, venulis parallelis a costa circ. angulo 90° divaricatis plus minus superiore recurvis a se 2-3 mm. remotis simplicibus distinctis haud elevatis haud impressis ad marginem fere attingentibus vel prope marginem evanescentibus apice haud elavatis, venulis recurrentibus nullis; pinnis laterali-



Fig. 60, A pinna of *Archangiopteris Somai* HAYATA $\times \frac{2}{3}$.

bus cum terminali conformibus sed paullo minoribus, petiolulis 5–8 mm. longis haud dilatatis haud articulatis haud geniculatis teretibus in exsiccato fuscentibus. Sori lineares 10–12 mm. longi secus venulas siti; sporangiis 60–70 2-seriatim dispositis, sub soris pilis sparce sitis; costa pinnæ utraque pagine plus minus elevata.

HAB. Urai, leg. T. SŌMA et B. HAYATA, Mai. 1916.

Resembles *Archangiopteris Henryi* CH. et GIES. in having simply pinnate fronds with linear sori; but differs from it by the much shorter and not tumid petioles of the pinnæ, in the very much longer apical tails of the latter, in the geniculate stipes with stipules at their very base, and in the less hairy sori which in our species are located much nearer to the costa than to the margin. Our species is, as a whole, much nearer to *Angiopteris* than *A. Henryi* is to the latter. The resemblance of our new fern with a simple pinnate form of *Angiopteris erecta* in its young stage is really very remarkable. The form of the stipules and the geniculation of the stipes are very similar in the two.

Cyatheaceæ.

There are in Formosa four genera belonging to this family. *Dicksonia* and *Cibotium* are distinctly distinguished from the other genera even in sterile specimens. *Cyathea* and *Alsophila* are on the other hand much confused in the field, when they are not in fertile specimens. Eight species of *Alsophila* are recorded from Formosa, while *Cyathea* is represented only by one, *C. spinulosa* WALL. As far as I can judge from my field-knowledge, there exist in Formosa only three species of *Alsophila* and one species of *Cyathea*,—i. e. *A. formosana*, *A. podophylla*, *A. latebrosa* and *C. spinulosa*. The first two species are distinguishable from the others by the much shorter stems not marked by the leaf-scars. *A. formosana* is the smallest and usually stemless with quite smooth stipes, while *A. podophylla* is a little larger with stems usually $\frac{1}{2}$ –1 m. long and very muricate stipes. *A. latebrosa* is the largest, its stems being marked very distinctly with leaf-scars and 2–20 m. tall, its fronds being ovate-oblong 260–400 cm. long 145 cm. broad, and its stipes being 15 cm. long, nearly smooth or very slightly muricate and covered with numerous white long soft scales at the base, while *Cyathea spinulosa* is a little

smaller than the preceding species, its stems being also marked with leaf-scars and 1-4 m. tall, its frond ovate-oblong 170-200 cm. long, 85 cm. broad, and its stipes 40-50 cm. long and very aculeate at the base. These four species are widely distributed in the island from Kōshūn northwards to Kelung. They are all that I know from Formosa. As to the other species recorded from the island, *A. contaminans*, *A. pastulosa* and *A. tomentosa* are presumably forms of *A. latebrosa*. *A. subglandulosa* HANCE is very likely a species of *Dryopteris*, as far as I can conjecture from a drawing made by myself in the British Museum from the original specimen preserved there; and finally *Alsophila denticulata* BAKER mentioned in Journ. Bot. (1885) p. 102 and MATSUM. et HAYATA Enum. Pl. Formos. p. 571, is very likely a species belonging also to *Dryopteris*. So far as I am aware, we have never seen so small a tree-fern as the latter species described as "stipe about a foot long; frond ovate-deltoid, 1½ ft. long, tripinnati-fid, but fertile also in a bipinnate form."

Polypodiaceæ.*

Athyrium ROTH.

Athyrium cryptogrammoides HAYATA sp. nov. Rhizoma ignotum. Stipes 10-25 cm. longus stramineus basi sparse squamatus, squamis lanceolatis castaneis apice acuminatis 5 mm. longis 1 mm. latis basi haud contractis. Frons in ambitu oblonga 30 cm. longa 15 cm. lata apice acuminatissima basi obtusa tripinnata, pinnis mediis alternis 10 cm. longis 3 cm. latis in ambitu lanceolatis apice acuminatissimis basi obtusissimis, pinnulis ordinis I. mediis oblique triangulari-lanceolatis 2 cm. longis 7 mm. latis apice obtusis basi oblique truncatis, pinnulis ordinis II. infimis longissimis, mediis obovatis 5 mm. longis 2 mm. latis apice obtusis basi oblique cuneatis pinnatilobis, lobis utroque latere circ. 2 lineari-oblongis 1 mm. longis $\frac{2}{3}$ mm. latis basi haud contractis apice acutis vel obtusis 1-nerviis, nervis simplicibus haud furcatis prope apicem attingentibus. Sori basi loborum pinnularum ordinis II. singulariter siti. Indusium lineare reniforme vel cordatum 1-½ mm. longum $\frac{2}{3}$ mm. latum margine erosum. Textura chartacea vel chartaceo-coriacea; pinnæ a rhachibus

* For convenience sake, the genera under this family are arranged in alphabetical order.

frondis angulo circ. 45° agressæ ascendentes, mediis longissimis superioribus gradatim minoribus versus apicem ad lobos acuminium abeuntibus; acuminibus frondis lineari-filiformibus utroque latere lobis remotis instructis; pinnis mediis a se $2\frac{1}{2}$ cm. remotis, pinnulis ordinis I. mediis a se 10–8 mm. remotis, pinnulis ordinis II. a se 2–3 mm. distantibus. Rhachis frondis subteres vel semi-teres straminea 1 mm. in diametro supra sulcata glabra; rhachis pinnarum ordinis I. gracillima $\frac{1}{3}$ mm. in diametro semi-teres glabra; rhachis pinnularum ordinis II. $\frac{1}{3}$ – $\frac{1}{2}$ mm. lata plus minus complanata supra profunde sulcata secus sulcum setulosa, setulis erectis 1 mm. longis validiusculis a se 1– $1\frac{1}{2}$ mm. remotis.

HAB. Gokwanzan, leg. YADA, Dec. 1914.

Remarkable for the very narrow linear segments and pinnulis.

Blechnum Linn.

***Blechnum* (*Blechnidium*) *plagiogyriifrons* HAYATA sp. nov. (Pl. XX.)**

Rhizoma longe horizontaliter repens teres gracile, squamis dense obtectum, squamis castaneo-coloratis ovato-lanceolatis 5 mm. longis 1 mm. latis apice acuminatis vel filiforme-acuminatis ad summum obtusis basi subcordatis vel rotundatis margine subintegris. Stipes gracilis distans 20 cm. longus cum fronde æquilongus supra tenuiter sulcatus subteres supra pallidus subtus purpurascens basi squamatus cæterum toto glaber. Frons ovato-lanceolata 20–27 cm. longa 7–9 cm. lata ad rhachin pinnatifida, lobis vel segmentis approximatis linearibus, pinnis inferioribus prope medium longissimis $3\frac{1}{2}$ –5 cm. longis basi 8–11 mm. latis basi latissimis falcatis recurvis apice acutis margine integris, superioribus gradatim minoribus ad lobum terminalem abeuntibus, lobo terminali 3–5 cm. longo lineari-acuminato integro vel undulato; segmentis inferioribus prope basin frondis abrupte minoribus ad aurículas abeuntibus, auriculis utroque latere basis frondis 2–3 vel 4 semi-rotundatis 3–8 mm. longis et latis; pagina tenuiter coriacea utraque glabra supra atro-viridis subtus pallidissima vix vel haud nitida, costa frondis supra elevata tenuiter sulcata subtus elevata, costis segmentorum supra tenuissime elevatis vel impressis subtus elevatis, venis venulis reticulatis. Sori utroque latere costæ pinnæ secus costam approximatis siti lineares, a rhachi costæ frondis 2 mm. remotis et ab apice pinnarum $1\frac{1}{2}$ cm. distantes. Indusium lineare $1\frac{1}{2}$ mm. latum margine erosum vel denticulatum; pinnæ ad marginem subito tenuiores deorsum recurvæ.

HAB. Inter Ushōkō et Arisan, ad 7000 ped. alt., leg. B. HAYATA, April. 1916.

Near *Blechnum melanopum* (HOOK. Sp. Fil. III. p. 64 t. CLXI.); but slightly different from it in having less anastomosing veins. In appearance, the present species is very like sterile fronds of *Plagiogyria falcata* which grow on rocks with the new fern.

***Cyclophorus* DESV.**

***Cyclophorus Sasakii* HAYATA sp. nov.** (Fig. 61). Rhizoma repens teres gracile primum versus apicem densissime squamatum, (squamis castaneis lineari-lanceolatis 5–6 mm. longis $\frac{1}{2}$ mm. latis apice acuminatissimis basi rotundatis peltatis insertis, basi ad extremitatem pauce fimbriatis vel haud fimbriatis), demum subglabratum 1 mm. in diametro sectionis remote frondigerum.



Fig. 61, Cross section of a frond of *Cyclophorus Sasakii* HAYATA.

Frons a se circ. 1 cm. distans subsessilis vel brevissime tipitata lineari-lanceolata $3\frac{1}{2}$ cm. longa 3 mm. lata apice obtusa basi ad stipitem abeuns margine integerrima valde deorsum usque ad costam convoluta-recurva supra medio impresso-sulcata, supra glabra subtus stellato-pilosa. Textura crassissima. Sori ignoti.

HAB. Shintiku: Karizenzan, leg. S. SASAKI, Jan. 1916.

Very near *Polypodium angustissimum* BAKER. Undoubtedly our plant belongs to the same section with that species.

***Dryopters* ADANS.**

***Dryopteris Sasakii* HAYATA n. n.**

Dryopteris tenuifrons HAYATA Ic. Pl. Formos. IV. p. 184 (non C. CH.).

***Dryopteris woodsii* HAYATA sp. nov.** Rhizoma ascendens crassum dense squamatum. Stipes 4–5 cm. longus dense squamatus, squamis stramineis lineari-lanceolatis circ. 1 cm. longis $1-1\frac{1}{2}$ mm. latis apice acuminatissimis margine aristis brevissimis minutis remote instructis. Frons in ambitu ovato-lanceolata apice acuminata basi obtusa vel truncata 9 cm. longa $3\frac{1}{2}$ –4 cm. lata pinnata, pinnis divaricatis a rhachi frondis angulo 90° egressis, superioribus gradatim minoribus, pinnis infra medium sitis longissimis lineari-triangularibus 18 mm. longis 8 mm. latis apice obtusissimis basi truncatis brevissime

stipitatis pinnatifidis, lobis oblongis apice truncatis dentatis latere margine integris; textura herbacea chartacea; rhachis breve squamato-hirsuta; pagina frondis sub microscopio minute glanduloso-hirsuta. Sori reniformes $1\frac{1}{4}$ mm. longi $1\frac{1}{2}$ mm. lati basi profunde cordati sacciforme et pulvini-formes, ad sinus inter pinnarum lobos siti.

HAB. in rupibus Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. No. 518.

Humata CAV.

Humata dryopteridifrons HAYATA sp. nov. Rhizoma ignotum. Stipes circ. 30 cm. longus glaberrimus haud squamatus teres supra stramineus subtus castaneo-coloratus. Frons lanceolato-ovata circ. 23 cm. longa 10 cm. lata apice acuminata basi obtusa vel rotundata basi tripinnata sursum bipinnata, pinnis infimis triangulari-lanceolatis 10 cm. longis 3 cm. latis apice acuminatis basi latissimis truncatis bipinnatis, pinnulis ordinis I. infimis longissimis superioribus gradatim brevioribus versus apicem ad lobos abeuntibus, pinnulis ordinis I. infimis exterioribus longissimis 23 mm. longis 13 mm. latis triangulari-lanceolatis apice obtusissimis basi triangulari-acutis pinnatis, pinnulis ordinis II. infimis interioribus obovatis 1 cm. longis 7 mm. latis apice obtusissimis basi cuneatis margine lobulatis, lobulis obtusis; pinnis petiolatis, petiolis infimis 1 cm. longis, pinnulis ordinis I. petiolulatis, petiolulis 3 mm. longis, pinnulis ordinis II. subsessilibus; pinnis alternis mediis a se $3\frac{1}{2}$ cm. remotis a rhachibus frondis, pinnulis a rhachibus pinnarum angulo 45° egressis. Textura membranacea glabra, pagine supra ad sorum rotundato-elevata. Sori ad apicem lorum lateris superioris vel infra sinus inter lobos lateris superioris siti; indusium depresso-rotundatum 2 mm. latum $1\frac{2}{3}$ mm. longum integrum basi contractum ad insertionem 1 mm. latum.

= *Davallia dryopteridifrons* HAYATA.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Junio 1914. (No. 615).

Remarkable for the broad lobes of the pinnules of the very thin texture.

Monachosorum KUNZE.

Monachosorum Maximowiczii (BAK.) HAYATA Tokyo Bot. Mag. (1909) p. 2; KODAMA in MATSUM. Ic. Pl. Koishikaw. I. p. 29 t. 15; *Polypodium Maximowiczii* BAK. Syn. Fil. p. 504; *Polystichum Maximowiczii* DIELS

Nat. Pl. Fam. I.-4, p. 189.

Var. **melanocaulon** HAYATA n. v. = *Polystichum Maximowiczii* var. *melanocaulon* HAYATA. Textura quam typo crassiora; stipites nigro-purpureascentes.

HAB. Nōkōzan, Aprili. 1916.

***Polypodium* LINN.**

***Polypodium suisha-stagnale* HAYATA sp. nov.** Rhizoma repens teres 6 mm. in diametro sectionis viride adpresse squamatum, squamis fulvis ovato-oblongis 5 mm. longis 2 mm. latis apice acutis vel obtusis basi peltatim cordatis vel profunde cordatis, lobis cordis imbricatis, margine erosis vel remote eroso-setulosis. Stipes erectus 65 cm. longus stramineus nitidus. Frons lanceolato-linearis 60 cm. longa 18 cm. lata pinnati-fida vel subpinnata, pinnis infimis longissimis superioribus gradatim minoribus, pinnis lateralibus superrimis minimis, pinna terminali longiore; pinnis lateralibus linearibus infimis 14 cm. longis 18 mm. latis apice obtusis vel acuminatis; pinna terminali lineari 10 cm. longa 13 mm. lata margine subintegra; pinnis a rhachi frondis angulo 45° egressis utraque pagine glabris costis et venis supra minus subtus plus elevatis; costa frondis utraque elevata haud sulcata, alis angustissimis 2-3 mm. latis; frons a medio sursum sorifera. Sori rotundati 2 mm. in diametro supra valde elevati, subtus valde impressi 1½ mm. profundi; receptaculum 1 mm. in diametro tenuiter elevatum.

HAB. in stagnis Suisha, leg. B. HAYATA, Aprili. 26, 1916.

The present new fern was found in a very boggy place in a floating island in Suisha-lake. Very near *P. longissimum* BLUME, but distinguishable from it by the thinner texture and by the deeper sunken sori.

***Vittaria* SM.**

Key to the Formosan Species of *Vittaria*.

1. Sori sunk in a two-lipped marginal groove (§ *Euvittaria*) 2
Sori in a slightly intramarginal line, with the unaltered edge of the frond produced beyond and often rolled over it (§ *Teniopsis*) .. 4
2. Fronds usually pendulous, very long usually over 30 cm., sometimes attaining to 1 m. or even more..... 3
Fronds usually erect more or less recurved at most 30 cm. long. 2-3

- mm. broad *V. anguste-elongata*
 3. Fronds not tortuous. *V. elongata*
 Fronds usually tortuous. *V. tortifrons*
 4. Fronds very narrow, usually 30 cm. long 2 mm. broad; sorus on the
 middle between margin and costa. *V. mediosora*
 Fronds 4–8 mm. broad 40–80 cm. long, sori located near the margin. . 5
 5. Fronds pendulous, scales brownish *V. arisanensis*
 Fronds suberect, scales much darker *V. suberecta*

Vittaria anguste-elongata HAYATA sp. nov. = *Vittaria* sp. HAYATA Ic. Pl. Formos. V. p. 346, fig. 149–a. Epiphytica ad truncos arboris crescens. Rhizoma dense squamatum dense frondigerum, squamis castaneo-fuscentibus 4–6 mm. longis basi $\frac{1}{2}$ mm. latis linearibus basi latissimis $\frac{1}{2}$ mm. latis apice subulato-acuminatis margine remote setulosis. Stipes supra subnullus subtus complanatus basi squamatus. Frons longissime linearis usque ad 30 cm. longa usque ad 3 mm. lata apice acuminatissima basi gradatim attenuata glabra margine integra margine haud vel vix recurva glabra. Textura chartaceo-coriacea, costa supra vix vel distincte elevata subtus plana haud elevata vel plus minus impressa. Sori ad sulcos marginales siti.

HAB. Urai, Suisha, Kelung, Giran, Sōseikyaku.

Near *V. elongata* Sw.; but separable from it in the much smaller fronds which are usually more or less tortuous, and in the scales which are brownish and less dark than those of *V. elongata*.

Vittaria elongata Sw.; MATSUM. et HAYATA Enum. Pl. Formos. p. 625.

HAB. Kaukaukei, Botansha, Suiteiryō, Urai, Randaisan.

Vittaria suberecta HAYATA sp. nov. *Vittaria* sp. No. III. Ic. Pl. Formos. V. p. 347 fig. 149 j–k. Epiphytica ad truncos arboris crescens suberecta plus minus curvato-descendens. Rhizoma cum basibus stipitum dense squamatum, squamis persistentibus fusco-nigricantibus lineari-lanceolatis 2 mm. longis apice subulato-acuminatis margine remote setulosis, dense frondigerum. Stipes atro-purpureus basi dense squamatus sursum glaber brevissimus sub-tetragonus supra sulcatus. Frons longissime linearis 20–50 cm. longa $3\frac{1}{2}$ –8 mm. lata apice acuminatissima basi gradatim attenuata ad stipitem brevissimum

abeuns margine integerrima in exsiccatō deorsum recurva utraque pagine glaberrima, costa supra impressa subtus prominente elevata; textura crassa in exsiccatō valde coriacea, venis haud visis. Sori intramarginales. *Vittaria lanceola* HAYATA in MATSUM. et HAYATA Enum. Pl. Formos. p. 625 (non CHRIST).

HAB. Musha Oiwake, ad 7000 ped. alt., leg. B. HAYATA, Aprili. 1916; Mingetsu; Arisan, inter Keitao et Goshōrin; Gōkwanzan, Urai.

Near *V. japonica*, but differs from it in the much thicker fronds and in the cellular structure of the scales which are a little darker than those of *V. japonica*.

Vittaria tortifrons HAYATA sp. nov. Epiphytica; rhizoma repens longissimum dense squamatum, squamis lanceolato-filiformibus 5–7 mm. longis nigricantibus basi ovatis vel ovato-cordatis 1 mm latis medio linearibus versus apicem filiformibus basi versus longitudinem exteriore plicatis margine remote serrulatis. Stipes 10–20 cm. longus. Frons longissime linearis verticaliter pendula usque ad 220 cm. longa 10–13 mm. lata apice basique gradatim angustissime acuminata utraque pagine glaberrima manifeste tortuosa, venis lateralibus distincte visis. Sori ad sulcos marginales siti.

HAB. Remogan, leg. B. HAYATA, Mai. 1916; Keitao, Ochōbi, Kusukusu, Taitō: Chihon.

Near *V. scolopendrina* THWAITES, but separable from it in the thinner and narrower fronds which have costa not impressed (but somewhat elevated on both surfaces, and especially by the sori which are in this new species at the marginal groove, but not intra-marginal).

Woodsia.

Woodsia polystichoides EAT. Rhizoma brevissimum repens dense frondigerum. Stipes nitidus castaneus vel stramineus dense cæspitosus 3–4½ cm. longus deorsum dense squamatus sursum sparse squamatus et eripato-hirsutus, pilis castaneis crispatis, squamis castaneis lanceolatis 2–3 mm. longis ½ mm. latis apice acuminatis margine integris vel fimbriis 1–2 instructis basi cordatis vel peltatis. Frons lineari-lanceolata 5–9 cm. longa 1½–2 cm. lata apice acuminata vel ad summum obtusa basi cum medio æquilata truncata simpliciter pinnata, pinnis mediis lineari-oblongis 7 mm.–11 mm. longis 2½ mm.–4 mm. latis apice

obtusis basi obliquis, latere inferiore basi fractis cuneato-acuminatis, latere superiore basi truncatis auriculatis latissimis cum rhachi parallelis, auriculis 4 mm. longis 2 mm. latis apice obtusissimis, margine subintegris vel repandis; costa supra impressa subtus tenuissime elevata inconspicua, venis lateralibus utraque pagine haud elevatis indistinctis basi vel medio furcatis, ramis simplicibus apice clavatis prope marginem attingentibus; pagine supra presertim versus costam hirsuta, subtus hirsuta et secus costam squamata, squamis lanceolatis acuminatis 2 mm. longis $\frac{1}{4}$ mm. latis pilis circ. 1 mm. longis articulatis; textura chartacea. Sori sescus marginem pinnarum 1-seriatim dispositi, prope apicem ramorum venarum lateraliter siti depresso-globosi 1 mm. in diametro. Indusium inferum cupuliforme margine lobulato-erosum intus glabrum extus setuloso-pilosum. Rhachis pilosa et squamata, pinnis alternis sessilibus vel subsessilibus mediis a se 8 mm. reinotis, a rhachi angulo recto vel obtuso divaricatis, pinnis superioribus gradatim minoribus ad pinnam terminalem minutam abeuntibus.

HAB. Arisan, ad 8000 ped. alt., leg. U. FAURIE, Junio 1914.

INDEX.

Orders in capitals; genera in full-face; species in romans; synonyms and species incidentally mentioned in italics.

Acanthephippium BLUME.	73	Begonia LINN.	21
" Yamamotoi HAYATA.	73	" aptera HAYATA.	21
Adinandra JACK.	4	" ferruginea HAYATA.	22
" lasiostyla HAYATA.	4	" laciniata ROXB. var. formosana HAYATA.	22
Amorphophallus BLUME.	101	Beilschmiedia NEES.	37
" campanulatus BLUME.	103	" erythrophloia HAYATA.	37
" gigantiflorus HAYATA.	101	<i>Bletia formosana</i> HAYATA.	75
Anodendron A. DC.	29	Bletilla REICH.	75
" suishaense HAYATA.	29	" formosana (HAYATA) SCHLECHL.	75
APOCYNACEÆ.	29	Blechnum LINN.	157
Archangiopteris CHRIST et GIESENHA- GEN.	154	" plagiogyriifrons HAYATA.	157
" Somai HAYATA.	154	" melanopum HOOK.	158
ARALIACEÆ.	23	BORAGINEÆ.	31
Arisæma MART.	100	Bulbophyllum THOU.	72
" arisanensis HAYATA.	100	" Saruwatarii HAYATA.	72
ARISTOLOCHACEÆ.	36	" transarisanense HAYATA.	73
Aristolochia LINN.	36	Calanthe R. BR.	77
" Shimadai HAYATA.	36	" arisanensis HAYATA.	78
" <i>Kœmpferi</i> WILLD.	37	" raishansensis HAYATA.	77
Arundinaria MICH.	136	Callicarpa LINN.	35
" Kunishii HAYATA.	136	" antaensis HAYATA.	36
" niitakayamensis HAYATA.	137	" cana LINN.	35
" oiwakensis HAYATA.	137	Callitriche LINN.	21
" Usawai HAYATA.	138	" japonica ENGELM.	21
AROIDEÆ.	100	Carpinus LINN.	62
Athyrium ROTH.	156	" hogoensis HAYATA.	62
" cryptogrammoides HAYATA.	156	" rankanensis HAYATA.	63
BERBERIDEÆ.	1	CAPRIFOLIACEÆ.	24
Bambusa SCHREM.	143	Carex LINN.	117
" breviflora MUNRO.	143	" alliiformis C. B. CLARKE.	128
" dolichoclada HAYATA.	144	" arisanensis HAYATA.	130
" dolichomerithalla HAYATA.	146	" atronucula HAYATA.	131
" Fauriei HACKEL.	148	" baccans NEES.	122
" liukiensis HAYATA.	148	" bilateralis HAYATA.	127
" Oldhami MUNRO.	150	" breviculmis R. BR.	125
" pachinensis HAYATA.	150	" brunnea THUNB.	128
" Shimadai HAYATA.	151	" chinensis RETZ.	131
" stenostachys HACK.	152	" Dunni HAYATA.	133
BEGONIACEÆ.	21	" filicina NEES.	122

Carex <i>fulvo-rubescens</i> HAYATA.	127
„ <i>hakkuensis</i> HAYATA.	122
„ <i>hebecarpa</i> C. A. MEY var. <i>ligulata</i> (NEES) KÜENTHAL.	133
„ <i>Kawakamii</i> HAYATA.	129
„ <i>longispica</i> HAYATA.	127
„ <i>maculata</i> BOOTT.	124
„ <i>Morii</i> HAYATA.	135
„ <i>morrisonicola</i> HAYATA.	125
„ <i>Nakaharai</i> HAYATA.	127
„ <i>obtusobracteata</i> HAYATA.	131
„ <i>orthostemon</i> HAYATA.	126
„ <i>pseudo-arenicola</i> HAYATA.	118
„ <i>pseudojaponica</i> HAYATA.	129
„ <i>pumila</i> THUNB.	131
„ <i>reflexistyla</i> HAYATA.	133
„ <i>Sasakii</i> HAYATA.	131
„ <i>satsumensis</i> FR. et SAV. var. <i>Nakaii</i> HAYATA.	121
„ <i>satsumensis</i> FR. et SAV. var. <i>longi-</i> <i>culma</i> HAYATA.	120
„ <i>Shimadai</i> HAYATA.	127
„ <i>tristachya</i> THUNB. var. <i>pocilli-</i> <i>formis</i> KÜK.	125
„ <i>sociata</i> HAYATA.	131
„ <i>transalpina</i> HAYATA.	125
„ <i>tatsutakensis</i> HAYATA.	133
CELASTRINEÆ	14
Celastrus LINN.	14
„ <i>elevativena</i> HAYATA.	14
„ <i>leiocarpa</i> HAYATA.	14
Chamabaina WIGHT.	61
„ <i>Morii</i> HAYATA.	61
Chrysanthemum LESS.	26
„ <i>arisanense</i> HAYATA.	26
Citrus LINN.	13
„ <i>erythrocarpa</i> HAYATA.	13
Cladium P. BR.	117
„ <i>jamaicense</i> CRANTZ.	117
Clausena BURM.	12
„ <i>tetramera</i> HAYATA.	12
„ <i>Wampi</i> HAYATA.	8
COMPOSITÆ	26
CONIFERÆ	66
CONVOLVULACEÆ	33
Cordia LINN.	31
„ <i>Kanehirai</i> HAYATA.	31
Corylopsis SIEB. et ZUCC.	20
Corylopsis <i>stenopetala</i> HAYATA.	20
Cotoneaster MEDIK.	17
„ <i>morrisonensis</i> HAYATA.	17
CRASSULACEÆ	26
CUPULIFERÆ	62
CYATHEACEÆ	155
Cyclophorus DESV.	158
„ <i>Sasakii</i> HAYATA.	158
Cyclostemon BLUME.	42
„ <i>hieranense</i> HAYATA.	42
Cymbidium SW.	79
„ <i>albo-jucundissimum</i> HAYATA.	80
„ <i>arrogans</i> HAYATA.	79
„ <i>sinense</i> WILLD. var. <i>margi-</i> <i>colatum</i> HAYATA.	82
„ <i>oiwakenses</i> HAYATA.	80
„ <i>rubrigemmum</i> HAYATA.	81
CYPÉRACEÆ	103
Cyperus LINN.	103
„ <i>dense-spicatus</i> HAYATA.	105
„ <i>procerus</i> ROTTB.	105
„ <i>pilosus</i> VAHL.	106
Cypripedium LINN.	66
„ <i>formosanum</i> HAYATA.	66
Daphniphyllum BLUME.	41
„ <i>membranaceum</i> HAY.	41
Davallia	159
„ <i>dryopteridifrons</i> HAYATA.	159
Dendrobium SW.	70
„ <i>Nakaharai</i> SCHLECHTER.	71
„ <i>Père Fauriei</i> HAYATA.	70
„ <i>sanseiense</i> HAYATA.	70
„ <i>Somai</i> HAYATA.	71
Dryopteris ADANS.	158
„ <i>woodsiiisora</i> HAYATA.	158
„ <i>Sasakii</i> HAYATA.	158
„ <i>tenuifrons</i> HAYATA.	158
Elatostema FORST.	57
„ <i>herbaceifolia</i> HAYATA.	57
„ <i>lineolatum</i> WIGHT.	58
„ <i>lineolatum</i> WIGHT var. <i>major</i> THW.	58
„ <i>microcephalantha</i> HAYATA.	57
Eleocharis R. BR.	106
„ <i>acicularis</i> R. BROWN.	107
„ <i>capitata</i> R. BR.	107
„ <i>fistulosa</i> LINK.	107
„ <i>Shimadai</i> HAYATA.	107

Engelhardtia LIESCH.	61	Gymnadenia <i>lepida</i> REICHB.	94
" <i>formosana</i> HAYATA.	61	" <i>Tominagaii</i> HAYATA.	39
ERICACEÆ	28	Habenaria WILLD.	94
Eria LINDL.	73	" <i>Miersiana</i> CHAMP.	94
" <i>arisanensis</i> HAYATA.	73	HÆMODORACEÆ	94
Eucarex COSS et GERM.	124	HALORAGEÆ	21
EUPHORBIACEÆ	41	HAMAMELIDEÆ	20
Eulophia R. BR.	78	Heptapleurum GAERTN.	23
" <i>macrorrhiza</i> BLUME.	78	" <i>arboricolum</i> HAYATA.	23
" <i>ochobiensis</i> HAYATA.	78	" <i>octophyllum</i> HANCE.	24
Evodia FORST.	5	Heterosmilax KUNTH.	97
" <i>hirsutifolia</i> HAYATA.	5	" <i>arisanensis</i> HAYATA.	97
" <i>melieifolia</i> BENTH.	6	Humata CAY.	159
Fagara LINN.	8	" <i>dryopteridifrons</i> HAYATA.	159
" <i>Avicennæ</i> DC.	10	Indocarex BAILL.	120
" <i>cyrtorhachia</i> HAYATA.	8	Impatiens LINN.	4
" <i>laxifoliolata</i> HAYATA.	10	" <i>Noli-tangere</i> LINN.	5
" <i>leiorhachia</i> HAYATA.	10	" <i>Tayemonii</i> HAYATA.	4
Fimbristylis VAHL.	108	Itea LINN.	19
" <i>anpinensis</i> HAYATA.	108	" <i>arisanensis</i> HAYATA.	19
" <i>aginkotensis</i> HAYATA.	108	JUGLANDACEÆ	61
" <i>boninensis</i> HAYATA.	109	JUNCACEÆ	100
" <i>tikushiensis</i> HAYATA.	113	Juncus LINN.	100
" <i>takacensis</i> HAYATA.	112	" <i>bufonicus</i> LINN.	100
" <i>kankacensis</i> HAYATA.	111	" <i>leptocladus</i> HAYATA.	100
" <i>kagiensis</i> HAYATA.	110	Lactuca LINN.	28
Fleurya GAUDICH.	43	" <i>vericolor</i> SCH-BIP.	28
" <i>interrupta</i> GAUD.	43	LAURINEÆ	37
Fortunella <i>erythrocarpa</i> HAYATA.	13	Lecanthus WEDD.	52
Galeola LOUR.	87	" <i>Sasakii</i> HAYATA.	52
" <i>ochobiensis</i> HAYATA.	87	" <i>Wightii</i> HAYATA.	53
Gardneria WALL.	30	LILIACEÆ	97
" <i>mutans</i> S. et Z.	30	Lilium LINN.	97
" <i>Shimadai</i> HAYATA.	30	" <i>callosum</i> S. et Z.	100
Gastrodia R. BR.	93	" <i>Kanashiroi</i> HAYATA.	97
" <i>dioscoreirhiza</i> HAYATA.	93	" <i>talense</i> HAYATA.	98
Gerbera GRON.	27	LOGANIACEÆ	30
" <i>integripetala</i> HAYATA.	27	Lonicera LINN.	24
GENTIANACEÆ	31	" <i>angustifolia</i> HAYATA.	25
GESNERACEÆ	34	" <i>oiwakensis</i> HAYATA.	24
GERANIACEÆ	4	" <i>transarisanensis</i> HAYATA.	25
Goodyera R. BR.	91	LORANTHACEÆ	38
" <i>arisanensis</i> HAYATA.	91	Loranthus LINN.	38
" <i>cyrtoglossa</i> HAYATA.	92	" <i>liquidambaricolus</i> HAYATA.	38
" <i>longicolumna</i> HAYATA.	92	" <i>Owatarii</i> HAYATA.	39
" <i>nantensis</i> HAYATA.	92	Mahonia NUTT.	1
GRAMINEÆ	136	" <i>oiwakensis</i> HAYATA.	1
" R. BR.	93		

MARATTIACEÆ.	154	Physurus chinensis ROLFE.	87
Meliosma BLUME.	15	Picrasma BLUME.	13
" callicarpæfolia HAYATA.	15	" quassioides BENN.	13
Microcarpæa R. BR.	34	Pilea LINN.	43
" muscosa R. BR.	34	" brevicornuta HAYATA.	43
Microstylis NUTT.	68	" funkikensis HAYATA.	45
" arisanensis HAYATA.	68	" kankaoensis HAYATA.	46
" monophyllos LINDL.	70	" minute-pilosa HAYATA.	47
Monachosorum KUNZE.	159	" ovatinucula HAYATA.	48
" Maximowiczii (BAK.)		" rotundinucula HAYATA.	49
HAYATA var. melano-		" Somai HAYATA.	50
caulon HAYATA.	159	" taitoensis HAYATA.	51
Murraya LINN.	11	Platanthera RICH.	93
" euchrestifolia HAYATA.	11	" stenoglossa HAYATA.	43
Myrmechis BLUME.	90	Podocarpus L' HÉR.	66
" drymoglossifolia HAYATA.	90	" Nakaii HAYATA.	66
" gracilis BL.	91	POLYPODIACEÆ.	156
Nuphar SM.	2	Polypodium LINN.	160
" nipponicum MAKINO.	3	" suisha-stagnalis HAYATA.	
" Shimadai HAYATA.	2	Polystichum Maximowiczii var. melano-	
NYMPHÆACEÆ.	2	caulon HAYATA.	160
ORCHIDEÆ.	66	Quercus LINN.	61
Parasitipomæa HAYATA.	33	" longicaudata HAYATA.	64
" formosana HAYATA.	33	" Sasakii KANEHIRA.	64
Pellionia GAUDICH.	53	RHAMNEÆ.	14
" arisanensis HAYATA.	53	Rhamnus LINN.	14
" okinawensis HAYATA.	55	" oiwakensis HAYATA.	14
" radicans WEDD.	55	Rhododendron LINN.	28
" Tashiroi HAYATA.	56	" Mori HAYATA.	28
" trilobulata HAYATA.	56	Rhynchoglossum BLUME.	34
Peliosanthes ANDR.	94	" ? Sasakii HAYATA.	34
" arisanensis HAYATA.	94	Rhynchospora VAHL.	116
" courtallensis HAYATA.	95	" longisetigera HAYATA.	116
" Tashiroi HAYATA.	96	" glauca VAHL.	116
Phajus LOUR.	74	Rohdea ROTH.	97
" grandifolius LOUR.	74	" Watanabei HAYATA.	97
" maculatus LINDL.	75	ROSACEÆ.	16
" Somai HAYATA.	74	Rubus LINN.	16
Photinia LINDL.	17	" rarissimus HAYATA.	16
" lasiopetala HAYATA.	17	RUTACEÆ.	5
Phyllostachys SIEB. et ZUCC.	140	SABIACEÆ.	15
" formosana HAYATA.	140	Saccolabium BLUME	85
" lithophila HAYATA.	141	" formosanum HAYATA.	85
" nigripes HAYATA.	142	SALICINEÆ.	65
" pubescens H. LEHATE.	140	Salix LINN.	65
" mitis Riv.	140	" eriostroma HAYATA.	65
Phyllostachys Makinoi HAYATA.	142	" suishensis	65
Physurus RICH.	87	Sarcochilus R. BR.	83

Sarcochilus kusukusensis HAYATA. ..	83
" Saruwatarii HAYATA. ..	84
<i>Sasa nitakayamensis</i> CAMUS. ..	137
SAXIFRAGEÆ ..	19
Scirpus LINN. ..	114
" erecto-gracilis HAYATA. ..	114
" morrisonensis HAYATA. ..	115
" Sasakii HAYATA. ..	115
" supinus LINN. ..	115
Scleria BERG. ..	117
" pubigera MAKINO. ..	117
SCROPHULARIACEÆ ..	34
Sedum LINN. ..	20
" drymarioides HAYATA. ..	20
" uralense HAYATA. ..	20
SIMARUBEÆ ..	13
Spiranthes L. C. RICH. ..	86
" australis LINDL. var. sui-	
shensis HAYATA. ..	86
STYRACEÆ ..	29
Swertia LINN. ..	31
" Kuroiwai MAKINO. ..	31
" shintenensis HAYATA. ..	31
Symplocos LINN. ..	29
" theifolia HAYATA. ..	29
Tainia BLUME. ..	75
" laxiflora MK. ..	77
" Shimadai HAYATA. ..	75
TERNSTROEMACEÆ ..	4
THYMELÆACEÆ ..	38
Trigonotis STEY. ..	32
Trigonotis elevato-venosa HAYATA. ..	32
Tropidia LINDL. ..	85
" angulata BLUME. ..	86
" Somai HAYATA. ..	85
URTICACEÆ ..	43
Vanilla Sw. ..	88
" Somai HAYATA. ..	88
VERBENACEÆ ..	35
VIOLACEÆ ..	3
Vignea NEES. ..	118
Viola LINN. ..	3
" senzanensis HAYATA. ..	3
" Tayemoni HAYATA. ..	3
Viscum LINN. ..	40
" album LINN. ..	39
" Alni-formosanæ HAYATA. ..	39
" diospyrosicolum HAYATA. ..	41
Vittaria SM. ..	160
" anguste-elongata HAYATA. ..	161
" elongata Sw.; ..	161
" suberecta HAYATA. ..	161
" tortifrons HAYATA. ..	162
Vrydagzynia BLUME. ..	88
" formosana HAYATA. ..	88
Wikstroemia ENDL. ..	38
" mononectaria HAYATA. ..	38
Woodsia ..	162
" polystichoides EAT. ..	162
Zanthoxylum LINN. ..	6
" acanthophyllum HAYATA. ..	7
" cuspidatum CHAMP. ..	7
" liukiunense HAYATA. ..	6
Zeuxine LINDL. ..	89
" tabiyahanensis HAYATA. ..	89

ICONES PLANTARUM FORMOSANARUM.

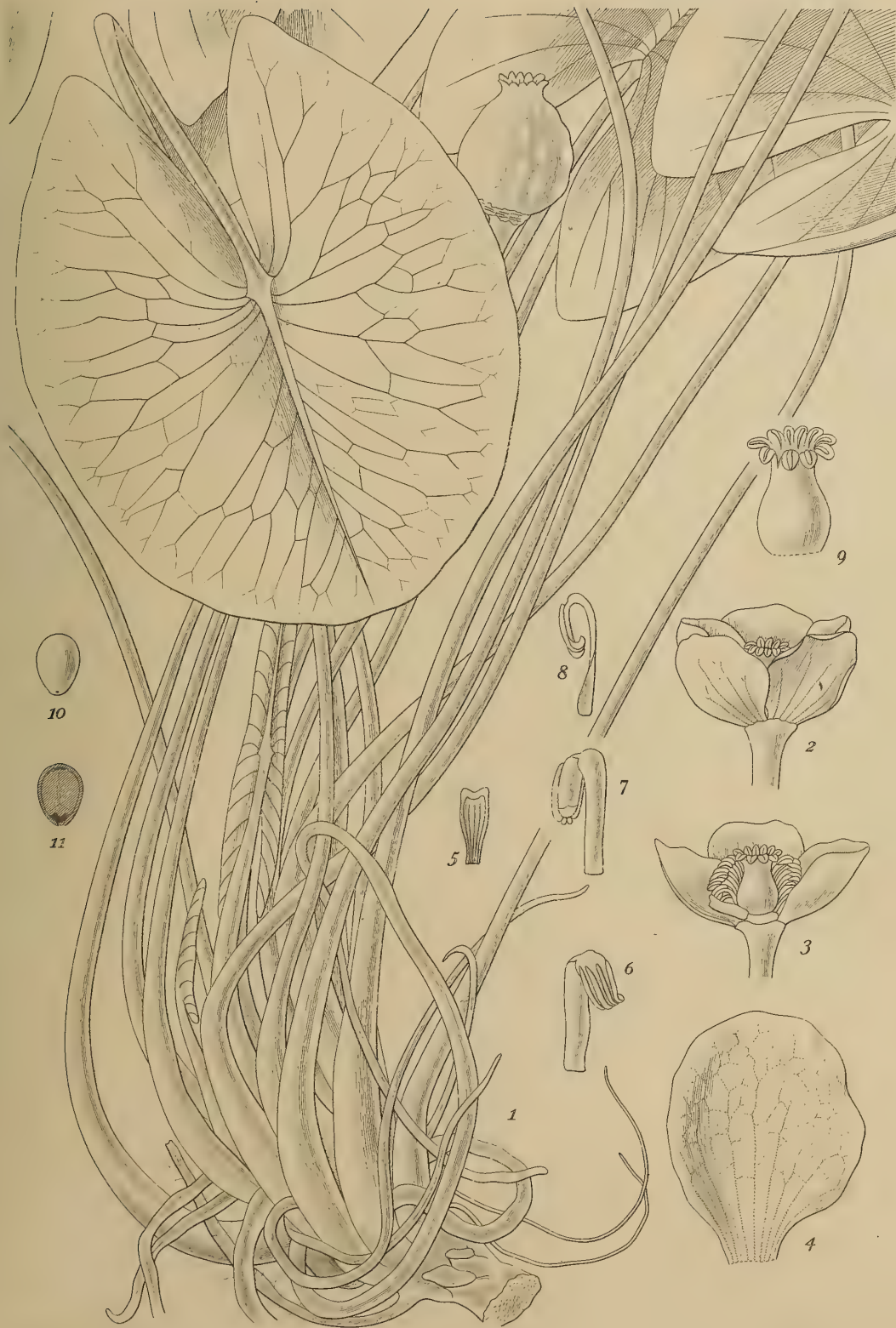
VI.

PLATE I.

Explanation of Pl. I.

Nuphar Shimadai HAYATA.

- Fig. 1. The plant.
2. A flower.
3. The same, sepals partly taken off.
4. A sepal.
5. A petal.
6, 7, 8. stamens, seen from different sides.
9. Ovary.
10. A seed.
11. The same in section.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE II.

Explanation of Pl. II.

Meliosma callicarpæfolia HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A flower.
4. A bracteole.
5. A sepal.
6. A petal.
7. A flower, sepals and petals taken off, showing stamens and staminodes.
8, 9, 10. Stamens seen from different sides.
11. A staminode.
12. Ovary with disc-glands.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE III.

Explanation of Pl. III.

Corylopsis stenopetala HAYATA.

- Fig. 1. The plant, natural size.
2. A flower $\times 10$.
3. A petal $\times 10$.
4, 5. Stamens, seen from different sides $\times 10$.
6. A gland $\times 10$.
7. Ovary $\times 7$.
8. Fruit-bearing spike n. s.
9. A fruit, n. s.
10. A seed, n. s.
11. The same, in section.



F. Hayami. del.

K. Nakazawa. sculp.

ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE IV.

Explanation of Pl. IV.

arborescens
Heptapleurum Sasakii HAYATA.

- Fig.** 1. A branch.
2. A leaf.
3. A flower.
4. The same, petals taken off.
5. A petal.
6, 7. Stamens, seen from different sides.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE V.

Explanation of Pl. V.

Lonicera oiwakensis HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A portion of the upper surface of a leaf.
4. A portion of the lower surface of a leaf.
5. Pair of flowers.
6. The same seen from back.
7. A flower seen from side.
8. Ovaries and a style.
9. Corolla expanded.
10, 11. Stamens, seen from different sides.
12. Ovary in vertical section.
13. A portion of the outer surface of the corolla-tube.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE VI.

Explanation of Pl. VI.

Chrysanthemum arisanense HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. An outer involucre bract.
4. An inner involucre bract.
5. A marginal flower.
6. Apical portion of the style.
7. Basal portion of the same style with the achene.
8. A disc-flower.
9. The same, corolla and stamens taken off.
10. Corolla expanded and stamens.
11. Stamens expanded.
12. An embryo.
13. The same, one of the cotyledons taken off.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE VII.

Explanation of Pl. VII.

Anodendron suishcense HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A flower.
4. A bracteole.
5. Sepals and ovary with disc-glands.
6. Corolla expanded, showing stamens.
7, 8, 9. Stamens, seen from different sides.
10. Disc-glands, expanded.
11. Style.
12. A carpel of the ovary.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE VIII.

Explanation of Pl. VIII.

Cyclostemon hieranense HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A male flower.
4. Discs in the center of a flower.

ICONES PLANTARUM FORMOSANARUM.

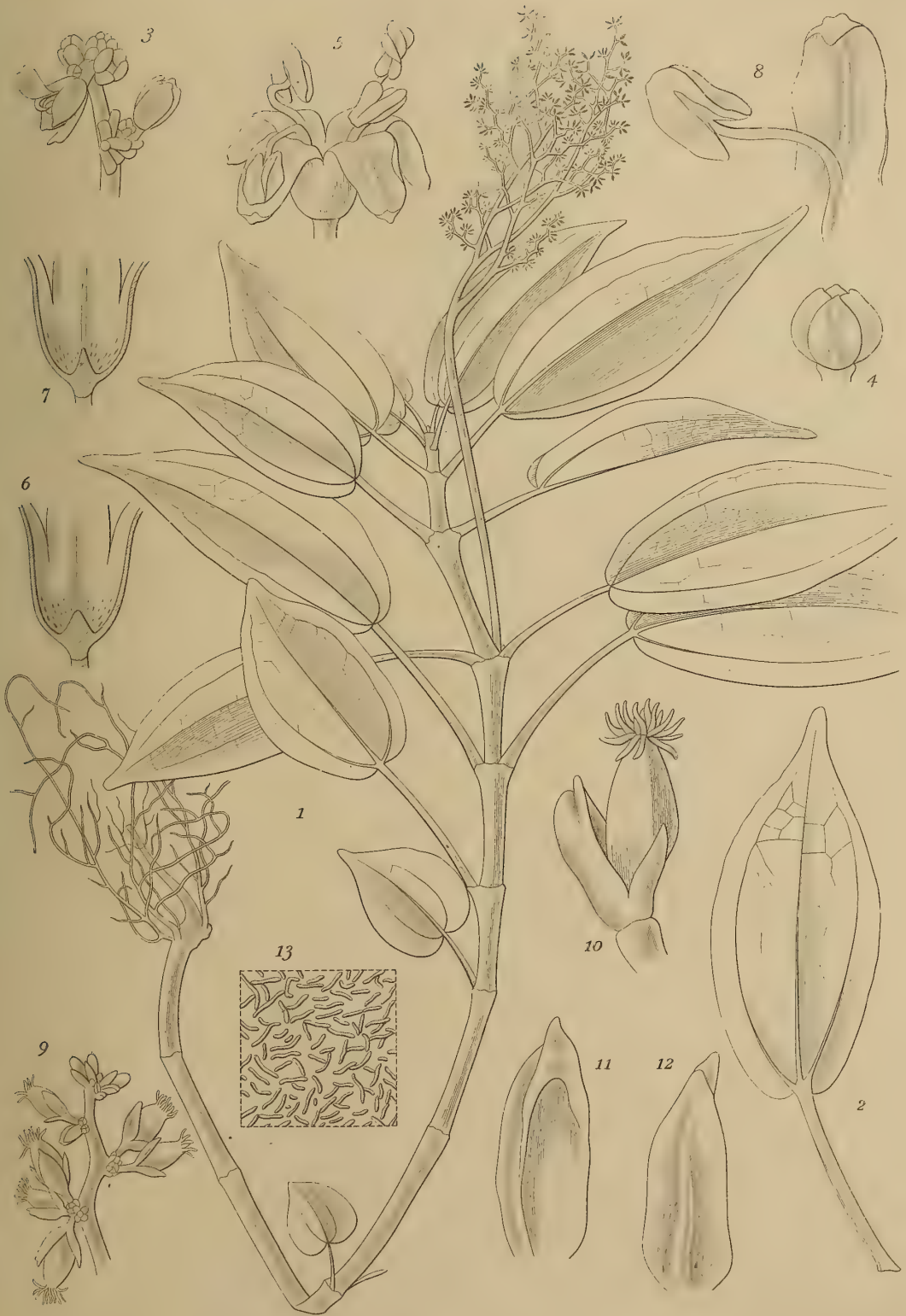
VI.

PLATE IX.

Explanation of Pl. IX.

Pilea kankacensis HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A portion of male inflorescence.
4. A male flower-bud.
5. A male flower.
6, 7. Sections of a tube of a perianth taken from different flowers.
8. A perianth-lobe with a stamen.
9. A portion of female inflorescence.
10. A female flower.
11, 12. A perianth-lobe of a female flower, seen from different sides.
13. Cystolithes on a leaf $\times 13$.



ICONES PLANTARUM FORMOSANARUM.

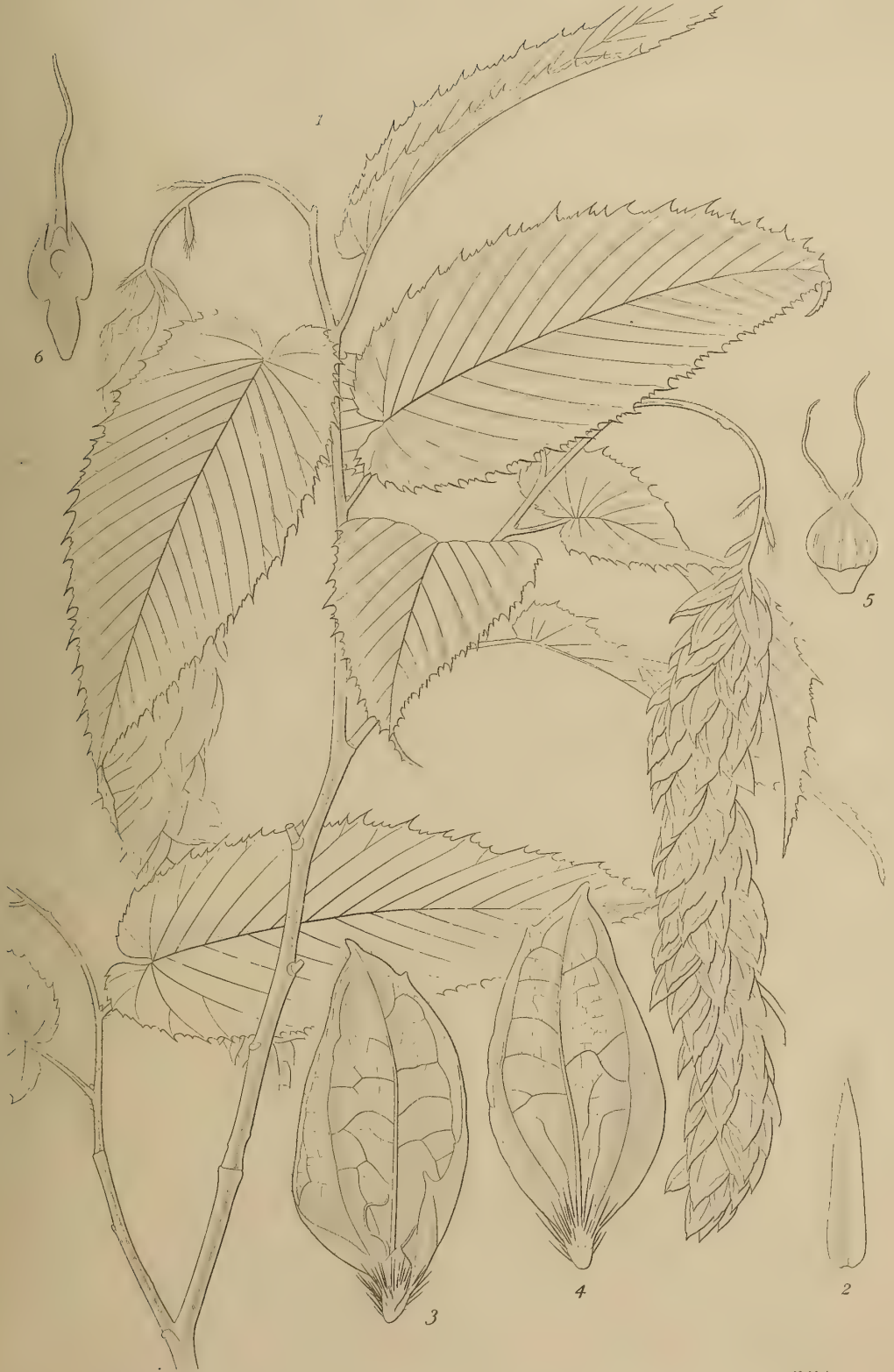
VI.

PLATE X.

Explanation of Pl. X.

Carpinus rankanensis HAYATA.

- Fig. 1. A branch.
2. A bract on the peduncle.
3. A fructiferous bract, seen from the inner side.
4. The same, seen from the outer side.
5. A premature achene.
6. The same, in section.



ICONES PLANTARUM FORMOSANARUM.

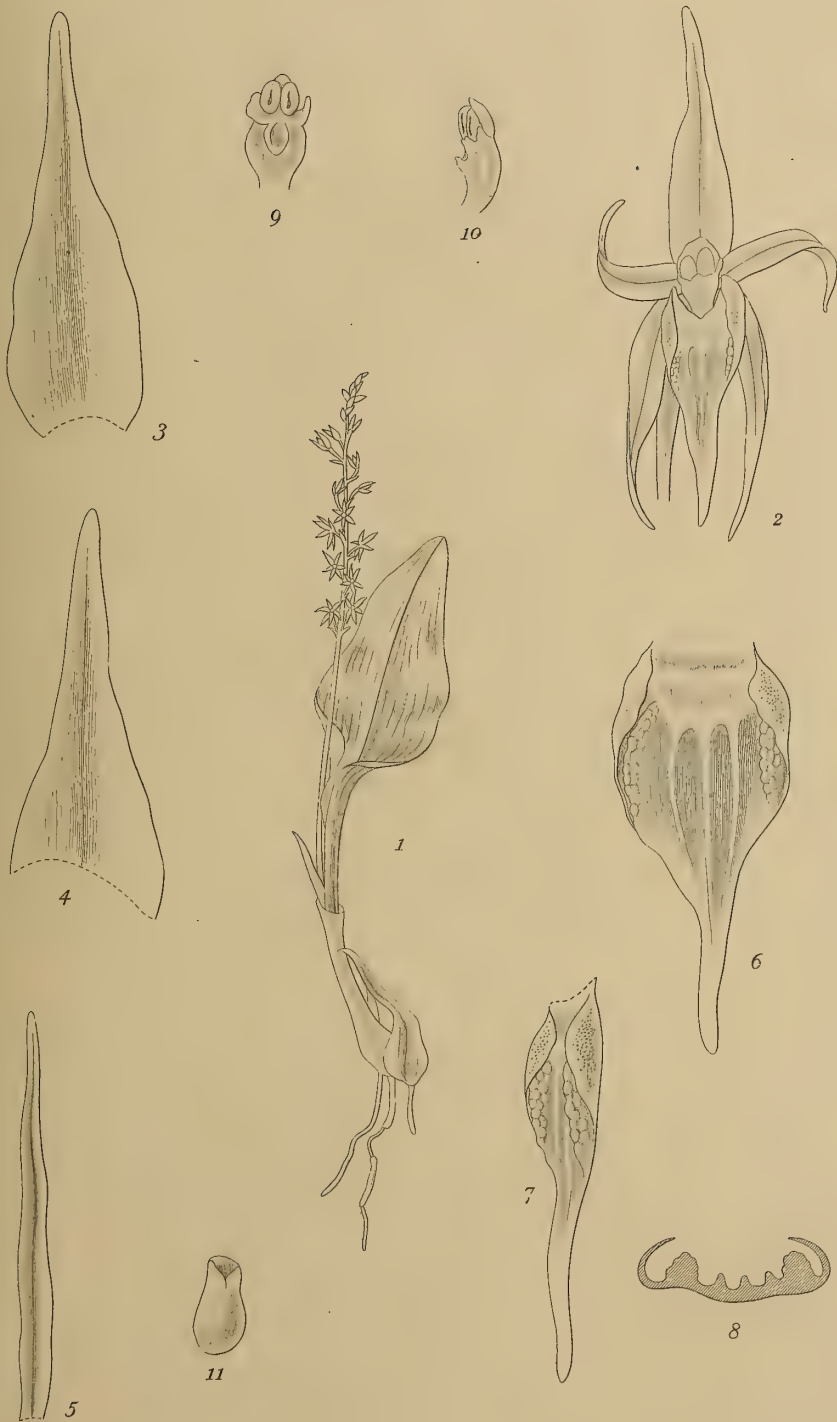
VI.

PLATE XI.

Explanation of Pl. XI.

Microstylis arisanensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. A dorsal sepal.
4. A lateral sepal.
5. A petal.
6. A labellum.
7. The same, seen from side.
8. The same, in cross section.
9. Column.
10. The same, seen from side.
11. A pollinium.



ICONES PLANTARUM FORMOSANARUM.

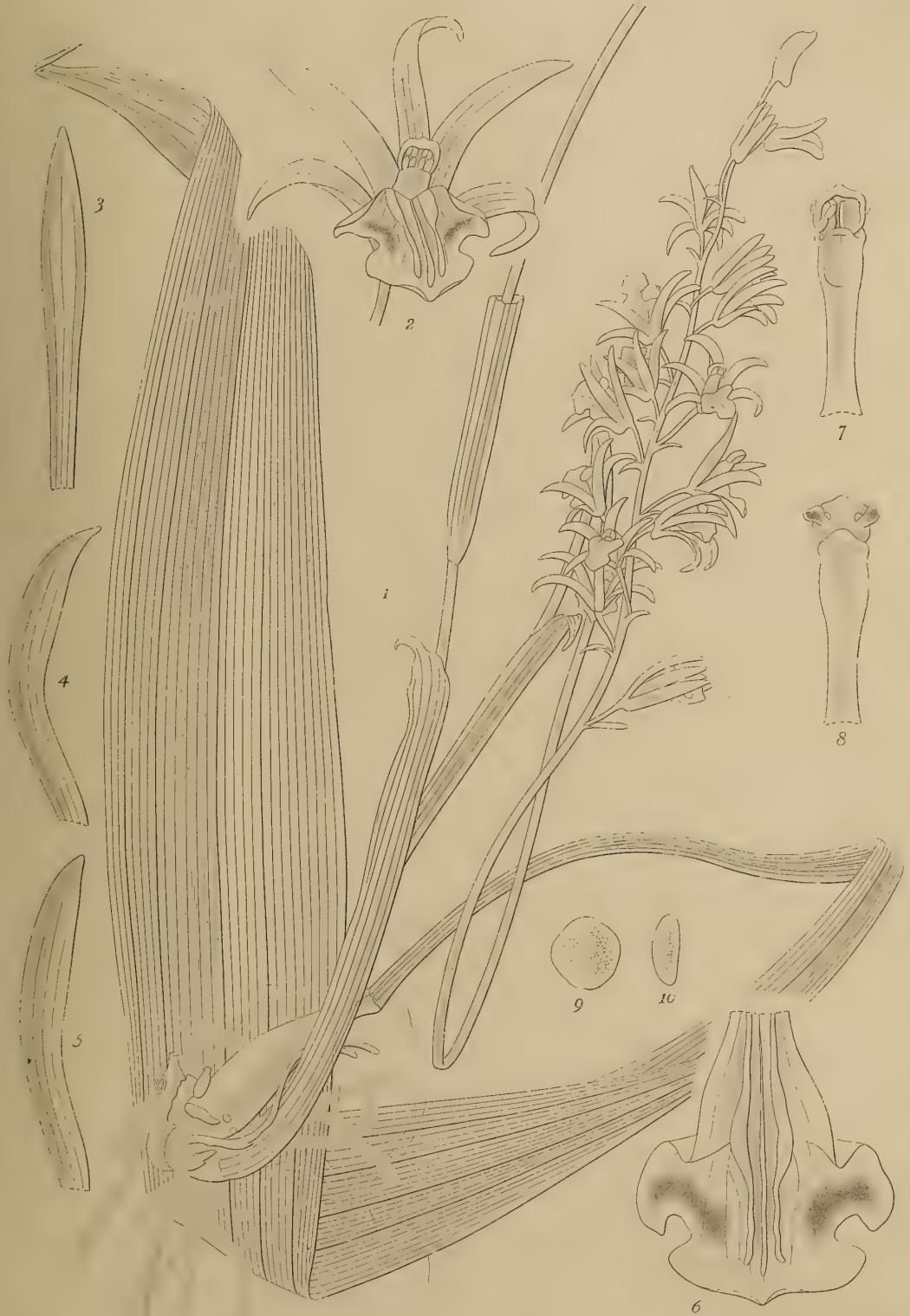
VI.

PLATE XII.

Explanation of Pl. XII.

Tainia Shimadai HAYATA.

- Fig. 1. The plant.
2. A flower.
3. A dorsal sepal.
4. A lateral sepal.
5. A petal.
6. A lip.
7. A column with the operculum.
8. The same, seen from dorsal side.
9. A pollinium.
10. The same, seen from side.



ICONES PLANTARUM FORMOSANARUM.

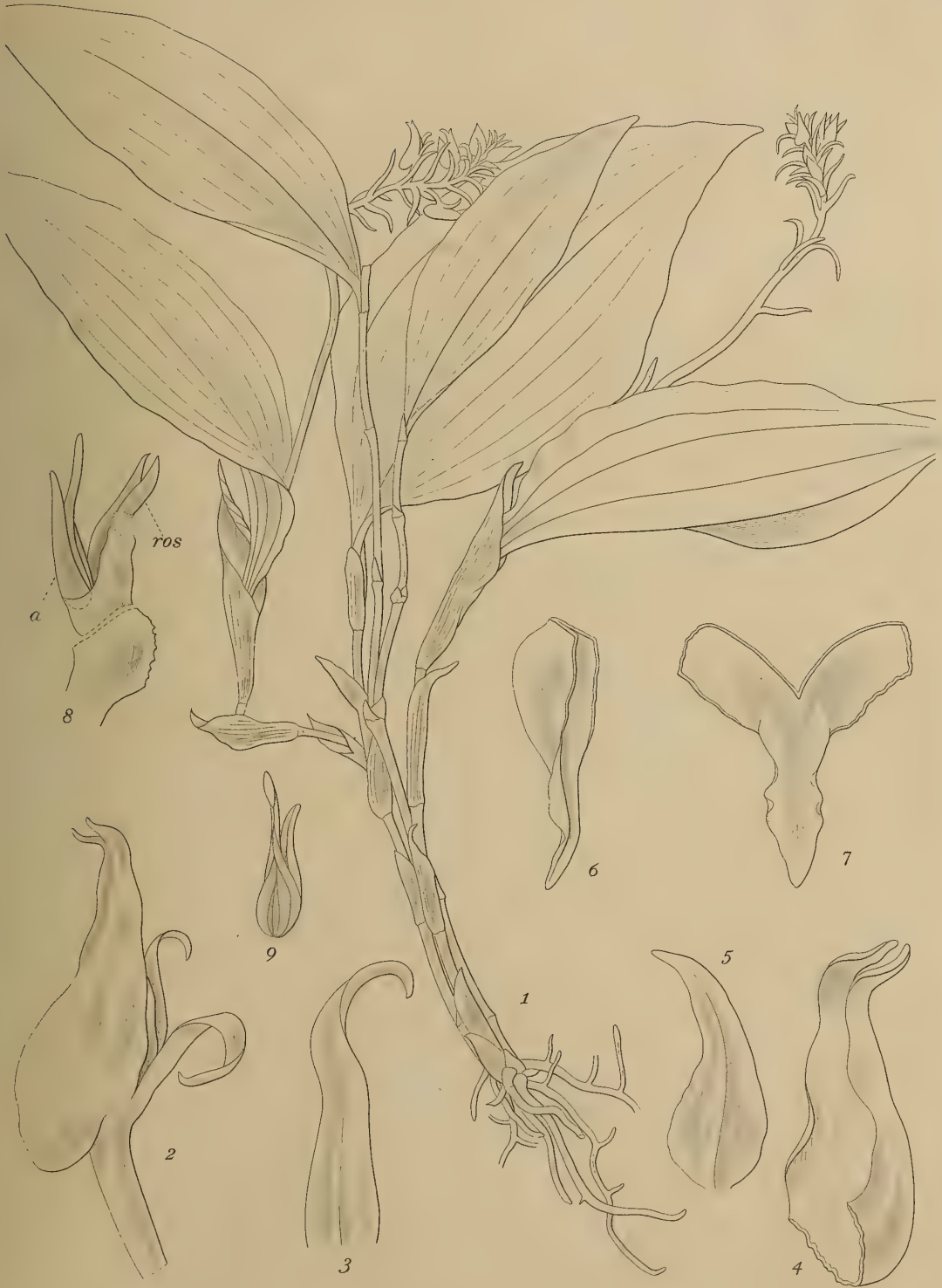
VI.

PLATE XIII.

Explanation of Pl. XIII.

Tropidia Somai HAYATA

- Fig. 1. The plant.
2. A flower.
3. A backward sepal.
4. Two lateral sepals.
5. A petal.
6. A lip, seen from side.
7. The same, basal portion cut and expanded.
8. A column ; ros.=rostellum ; a=anther.
9. An anther with po inia.



ICONES PLANTARUM FORMOSANARUM.

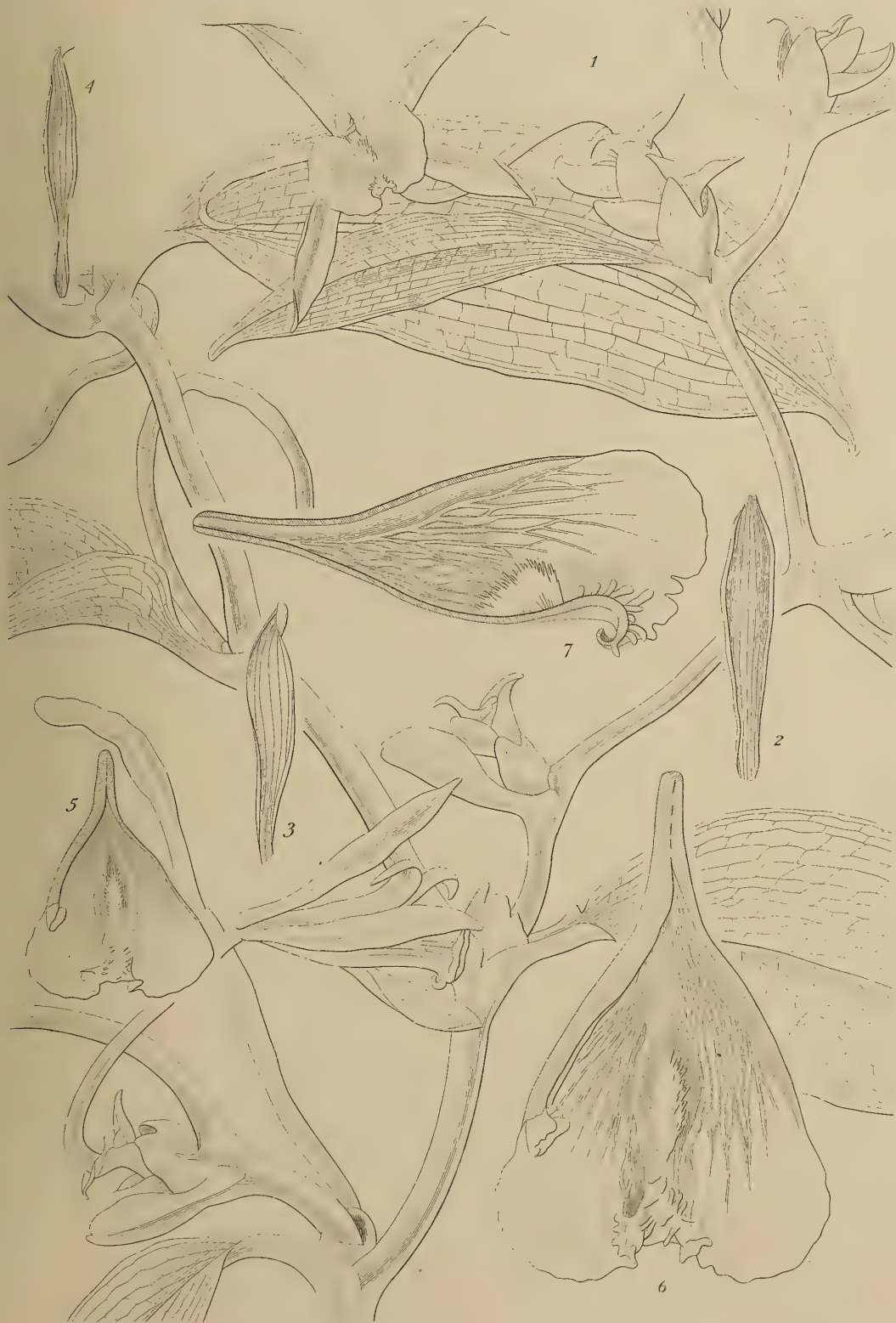
VI.

PLATE XIV.

Explanation of Pl. XIV.

Vanilla Somai HAYATA.

- Fig. 1. The plant, n. s.
2. A backward sepal, n. s.
3. A lateral sepal, n. s.
4. A petal, n. s.
5. A lip, n. s.
6. The same, magnified.
7. The same, in vertical section.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE XV.

Explanation of Pl. XV.

Peliosanthes arisanensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. The same in vertical section.
4. A portion of a staminal tube, showing two anthers.
5. A stigma.
6, 7. Seeds.
8. Cross section of a seed.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE XVI.

Explanation of Pl. XVI.

Rohdea Watanabei HAYATA.

- Fig. 1. The plant.
2. A flower, $\times 3$.
3. The same in vertical section, $\times 4$.
4. An interior lobe of the perianth, $\times 6$.
5, 6. Stamens seen from different sides, $\times 6$.
7. Ovary, seen from top, $\times 6$.
8. Cross section of ovary with perianth-tube.
9. A fruit, n. s.
10, 11, 12. Seeds, seen from different sides, $\times 3$.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE XVII.

Explanation of Pl. XVII.

Carex satsumensis FR. et SAV. var. *longiculma* HAYATA.

- Fig. 1. The plant.
2. Spikelet.
3. A bract at the base of a spikelet.
4. A cladophyllum.
5. The same, seen from side.
6. A scale of a female flower.
7. An utricle.
8. A nutlet.
9, 10. Other forms of nutlets.
11. A male flower.
12. Cross section of a nutlet.



ICONES PLANTARUM FORMOSANARUM.

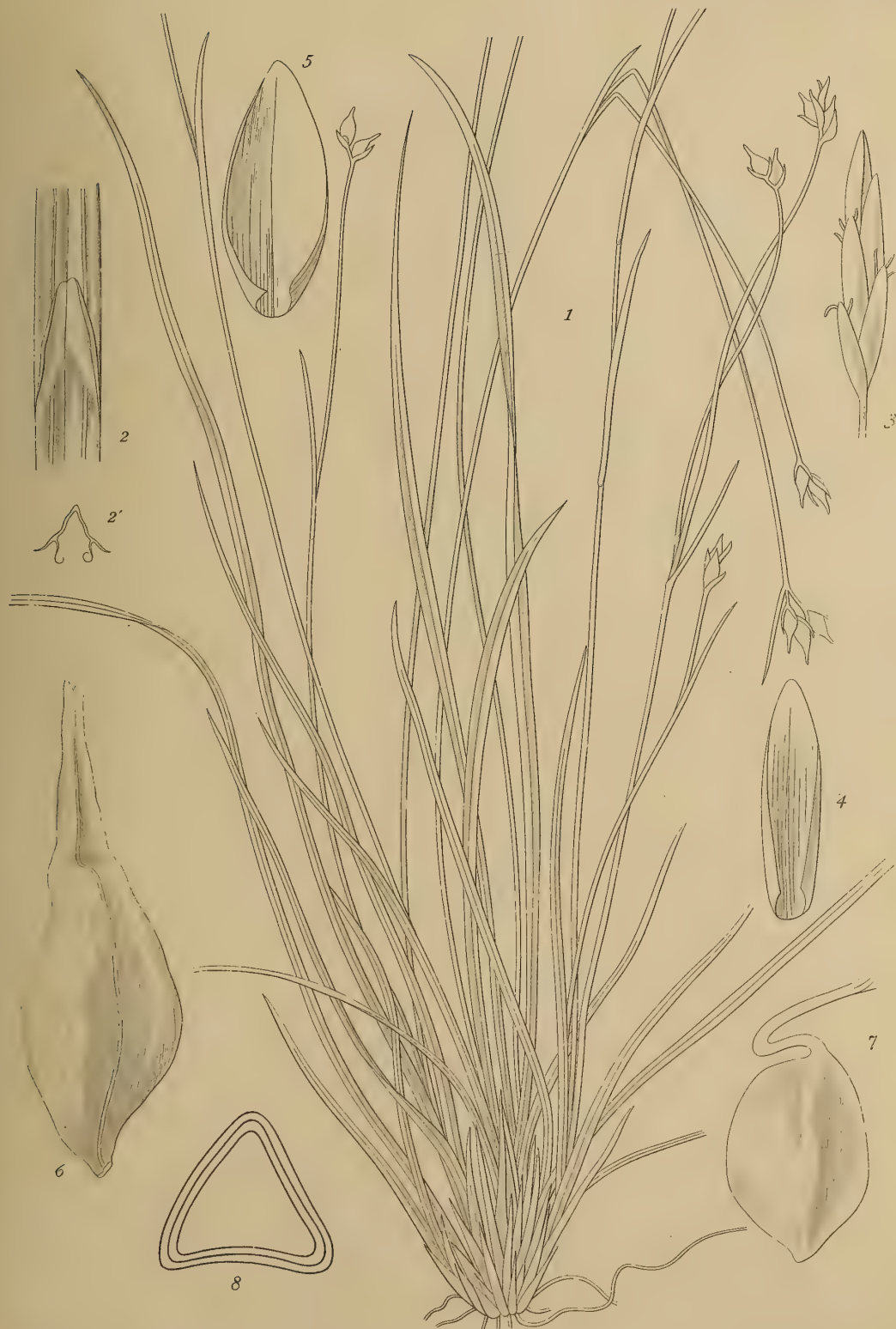
VI.

PLATE XVIII.

Explanation of Pl. XVIII.

Carex arisanensis HAYATA.

- Fig. 1. The plant.
2. A portion of a leaf, showing a ligule.
2'. A section of the same portion.
3. A male spikelet, anthers fallen off.
4. A glume of a male flower.
5. A glume of a female flower.
6, 7. Utricles seen from different sides.
8. Section of the same.
9. A nutlet.



ICONES PLANTARUM FORMOSANARUM.

VI.

PLATE XIX.

Explanation of Pl. XIX.

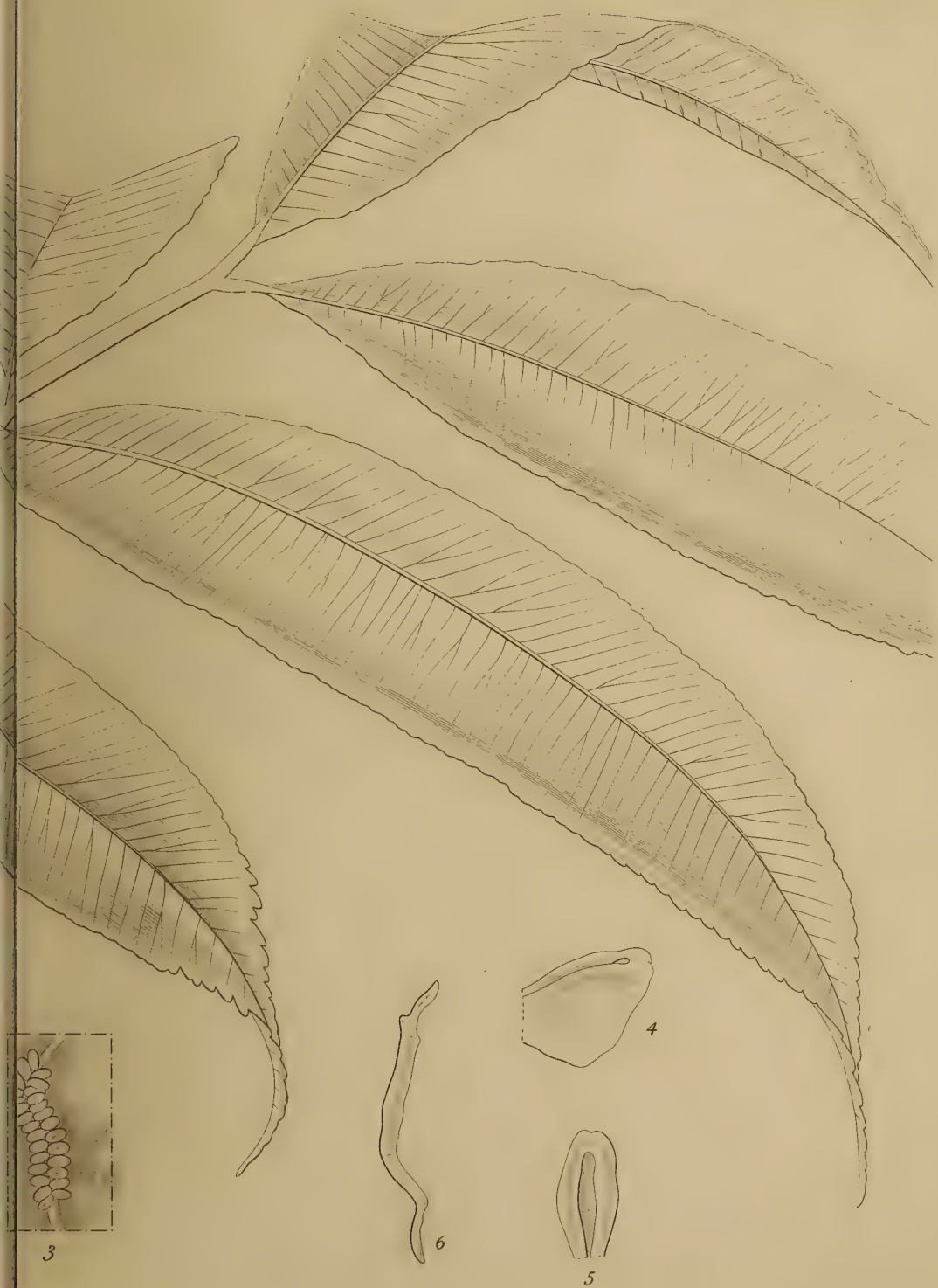
Archangiopteris Somai HAYATA.

- Fig. 1. The plant.
2. A scale.
3. A sorus.
4, 5. Sporangia.
6. A hair of an indusium.





F. Hayami del.



ICONES PLANTARUM FORMOSANARUM.

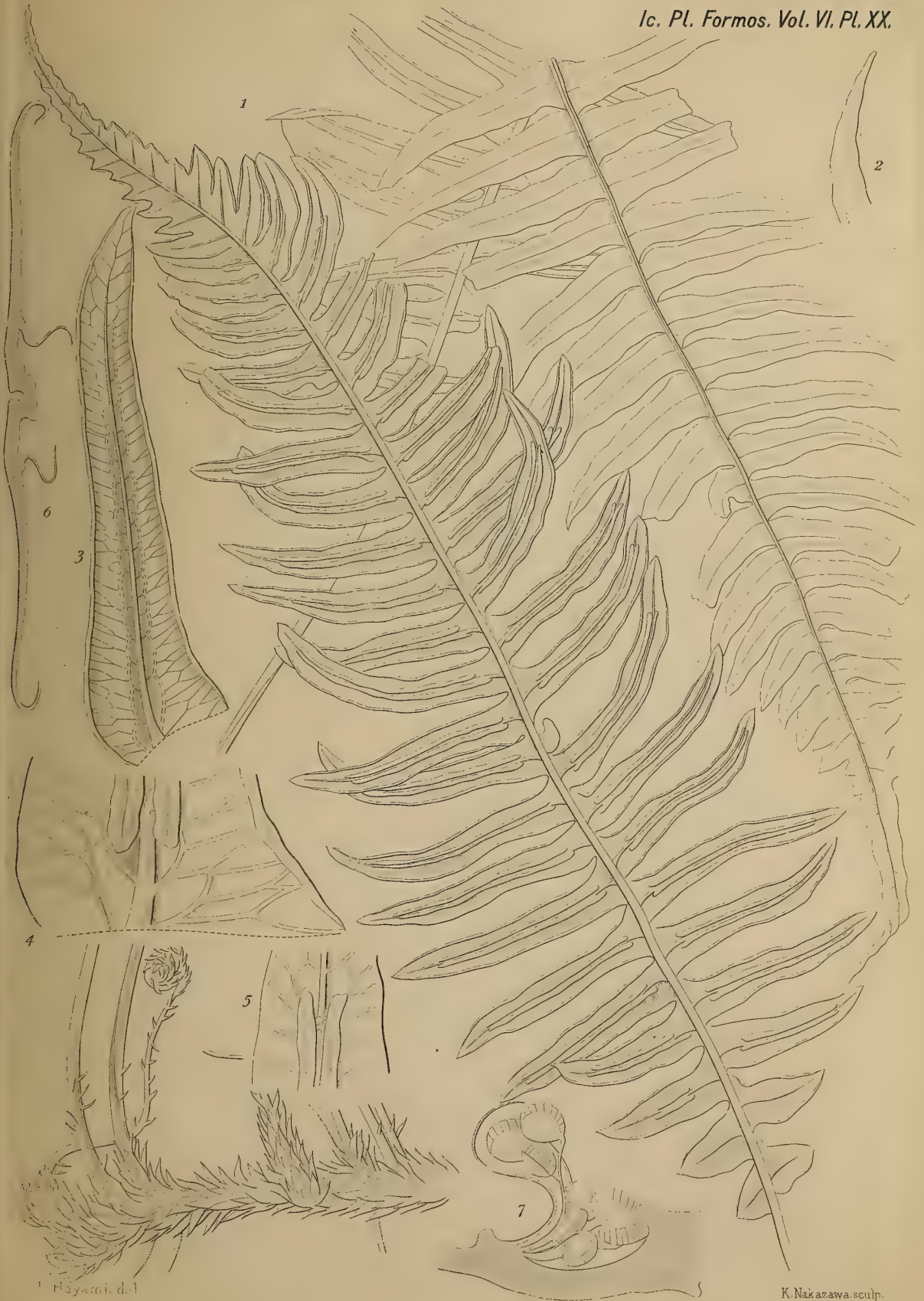
VI.

PLATE XX.

Explanation of Pl. XX.

Blechnum plagiogyriifrons HAYATA.

- Fig. 1. The plant.
2. A scale on the rhizoma.
3. A pinna, indusium and sporangia taken off, showing venation.
- 4, 5. Basal and apical portion of a pinna.
6. Cross section of a fertile pinna.
7. Portion of the same section, showing the receptaculum.



大正五年十二月二十五日印刷
大正五年十二月二十八日發行

編纂兼發行者 臺灣總督府民政部殖產局

東京市神田區美土代町二丁目一番地

印刷者 島 連 太 郎

東京市神田區美土代町二丁目一番地

印刷所 三 秀 舍

VOLUME VII

March 25th, 1918

臺灣植物圖譜

臺灣植物誌料

第七卷

Icones Plantarum Formosanarum

nec non et

Contributiones ad Floram Formosanam

or

Icones of the Plants of Formosa, and Materials for a Flora of the
Island, based on a Study of the Collections of the Botanical
Survey of the Government of Formosa

By

Bunzō Hayata, *Rigakuhakushi*

VOLUME VII

Published by the Bureau of Productive Industries,

Government of Formosa

TAIHOKU

NOTICE

- I. Dicotyledons—Polypetalous: Ranunculaceæ—Rosaceæ. Published September 10th, 1911.
- II. 1. Conspectus of the Flora of Formosa, Saxifrageæ—Dipsaceæ.
2. New or Noteworthy Plants of Formosa. Published October 15th, 1912.
- III. 1. Contributions to the Flora of Formosa, I.
2. On the Systematic Position of *Mitrastemon*, as a Genus representing a special Tribus of the Rafflesiaceæ. Published December 25th, 1913.
- IV. Contributions to the Flora of Formosa, II. Published November 25th, 1914.
- V. Contributions to the Flora of Formosa, III. Published November 25th, 1915.
- VI. Contributions to the Flora of Formosa, IV. Published November 25th, 1916.
- VII. Contributions to the Flora of Formosa, V. Published March 25th, 1918.
- VIII. Will be published in September 1918.
-

ICONES PLANTARUM FORMOSANARUM

NEC NON ET

**CONTRIBUTIONES AD FLORAM
FORMOSANAM**

VII

AUCTORE

Bunzo Hayata

TO HIS EXCELLENCY BARON TEIBI ANDO,

GOVERNOR GENERAL OF FORMOSA.

SIR,

I have the honour to submit to your Excellency the seventh volume of the *Icones Plantarum Formosanarum, nec non et Contributiones ad Floram Formosanam* by BUNZŌ HAYATA, D. Sc.

HIROSHI SHIMOMURA,

CIVIL GOVERNOR OF FORMOSA.

November 1, 1917, Taihoku.

INTRODUCTION.

As was announced in the introduction of the third volume of this work, the present volume is principally devoted to the fifth part of those studies which have for the most part been upon new material, collected since 1912.

The volume contains studies on species and varieties ranging from the Berberideæ down to the Selaginellaceæ. All the species of Phanerogamous plants are here arranged, as in the preceding volumes, after the system of BENTHAM and HOOKER; while those of vascular cryptogams are arranged after the system of ENGLER and PRANTL. Of the species and varieties mentioned in this work, 47 are proposed as new species and 3 are regarded as new varieties of known species. One genus, *Polliniopsis*, is proposed as a new, while 4 genera are mentioned as new to the flora of the island. The latter genera are as follows:—

<i>Sphaerocaryum</i>	<i>Axonopus</i>
<i>Euchlæna</i>	<i>Muehlenbergia</i>

Thus, up to the present date, the total number of species of the flora, so far as is known, is 3359 species and 57 varieties belonging to 1173 genera and 169 families.*

Finally, I avail myself of this opportunity to tender my hearty thanks to the officials of the Government of Formosa, to whom I am much indebted for help in the collection of material and in the publication of this work.

B. HAYATA.

October 1917, Taihoku and Tōkyō.

* Readers will notice that there are some differences between the numbers given in this volume and those in the preceding one. This is mainly explained by the fact that, since the publication of the General Index to the Flora of Formosa, a considerable number of doubtful species have been excluded from the flora of the island.

CONTENTS.

Introduction.	I.
Contributions to the Flora of Formosa VI.	1-102.
Index.	103-107.
Plates	I.-XIV.

Contributions to the Flora of Formosa.

V.

Berberideæ.

Mahonia NUTT.

Mahonia tikushiensis HAYATA (Pl. I.) Ic. Pl. Formos. V. p. 5.

Pittosporæ.

Pittosporum BANKS.

Pittosporum daphniphyloides HAYATA (Pl. II.) Mater. Fl. Formos. p. 34; Ic. Pl. Formos. V. p. 6.

Caryophylleæ.

Stellaria LINN.

Stellaria reticulivena HAYATA sp. nov. (Fig. 1.) Herba annua radiatim diffusa. Caulis ascendens diffuse ramosus vel haud ramosus tetragonus 1 mm. latus ad angulos hirsutus vel ad nodos plus hirsutus, internodiis inferioribus brevioribus superioribus longioribus 5-6 cm. longis. Folia ad nodos caulis versus totam longitudinem oppositum sita ovata circ. 2 cm. longa 12 mm. lata apice triangulare acuta basi rotundata sessilia margine integerrima marginata breve ciliolata plana, costa supra impressa subtus elevata, pagine supra subglabra subtus ad costas retrorse hirsuta cæterum glabra supra pallido-viridia haud nitida subtus pallidissima, venulis sub luce translucenti reticulatis. Flores cymosi, cymis terminalibus rarius axillaribus longe pedunculatis diffuse ramosis subglabris ad ramificationem bracteis minutis oppositis instructis, bracteis scariosis hyalinis oblongis concavis obtusis $1-1\frac{1}{2}$ mm. longis, pedicellis 1-2 cm. longis gracillimis. Sepala scariosa ovato-lanceolata $2\frac{1}{2}$ mm. longa 1 mm. lata apice acuminata basi plus minus contracta margine hyalina integra glabra medio dorso pallido-viridia. Petala 5 alte 2-fida, segmentis lineari-lanceolatis

2 mm. longis $\frac{1}{4}$ latis apice obtusis, basi attenuata alba. Stamina 10, filamentis filiformibus hyalinis circ. 2 mm. longis, antheris minutis reniformi-globosis. Ovarium ovoideum trigonum vel hexagonum 1 mm. longum $\frac{2}{3}$ mm. latum glabrum, stylis 3 apice recurvis $\frac{1}{2}$ mm. longis. Capsula ovoidea 3 mm. longa a medio sursum 6-valvatim dehiscens. Semina minuta oblonga $\frac{2}{3}$ mm. longa plus minus complanata utrinque obtusa rubescentia rugosa.

HAB. Taiheizan, leg. S. SASAKI et B. HAYATA, Mai. 1917.

Near *S. micrantha* HAY.; but differs from it by the ovate or nearly cordate leaves. The leaves of *S. micrantha* are much narrower than those of this new species.

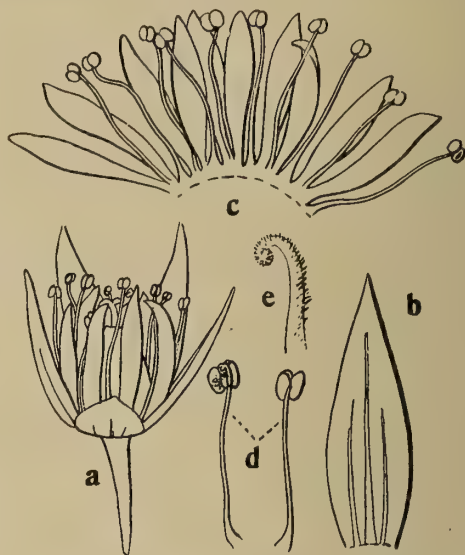


Fig. 1, *Stellaria reticulivena* HAYATA; a, a flower; b, a sepal; c, corolla with stamens, expanded; d, stamens; e, a portion of a style.

Ternstroemiaceæ.

Thea LINN.

Thea (Sect. *Camellia*) ***hozanensis*** HAYATA sp. nov. (Fig. 2) Arborescens. Truncus plus minus tortus. Rami et ramuli validiusculi cinerascens haud lenticellati. Folia alterna coriacea oblonga vel obovato-oblonga 8-9 cm. longa $3\frac{1}{2}$ -4 cm. lata apice subito acuminata ad summum obtusa basi acuta margine serrulata utraque glaberrima, costa supra haud vel vix elevata subtus haud elevata, venis primariis lateralibus utroque latere 7-8 mediis 50° a costa egressis rectis apice furcatim ramosis, petiolis 8-7 mm. longis glabris. Flores terminales solitarii vel geminatim siti infundibuliformes 4 cm. longi $4\frac{1}{2}$ cm. lati pallido-rosei. Sepala coriacea multa exteriora minora interiora majora, extima minuta lunuliformia 3 mm. longa 6 mm. lata, intima rotundata 12 mm. longa totiusque lata apice rotundata extus intusque sericeo-pubescentia margine membranacea glabra ciliolata. Corolla campanulato-

infundibuliformis, tubo late cylindrico-obconico basi 5 mm. lato apice 10 mm. lato 10 mm. longo, limbo 5-partito, segmentis subpatentibus rotundatis $2\frac{1}{2}$ cm. in diametro apice rotundatis ad centrum tenuiter sinuatis basi contractis margine integris venulis reticulatis. Stamina ∞ , filamentis ad $\frac{2}{3}$ altitudinem connatis glabris 3 cm. longis, antheris oblongo-ellipticis 2 mm. longis $1\frac{1}{2}$ mm. latis. Ovarium conico-globosum $2\frac{1}{2}$ mm. longum totiusque latum glabrum apice ad stylum abeuns, stylo glabro $2\frac{1}{2}$ cm. longo filiformi apice trifido, segmentis 3 mm. longis.

HAB. Hōzan prope Keitao, ad 5000 ped. alt. leg. B. HAYATA, Aprili. 1916.

Near *Thea japonica*; but differs from it by the funnel-shaped corolla and by the obtuse buds. In the Japanese species, the corolla is obconical but not attenuate towards the base, and the buds are acuminate at the apex.

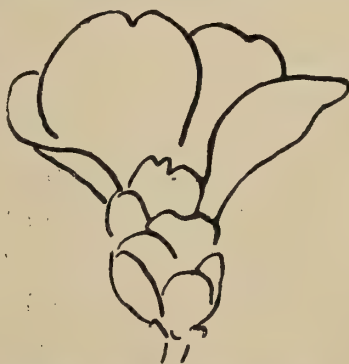


Fig. 2, *Thea hozanensis* HAYATA.

Thea (sect. *Camellia*) **Nakaii** HAYATA sp. nov. Truncus et habitudo ut *T. japonica*. Rami et ramuli cinerascens versus apicem purpurascens. Gemmae fusiformi-acuminatae. Folia coriacea oblata vel obovato-oblata 10-8 cm. longa 5-5 $\frac{1}{2}$ cm. lata apice brevis cuspidato-acuta ad summum obtusa basi acuta obtusa vel rotundata margine sursum minute serrulata deorsum integra, costa supra haud vel vix elevata, petiolis 1 cm. longis glabris. Flores terminales solitarii vel geminati. Sepala multi-seriatim disposita ut ea *Theae japonicae*. Corolla late obconica 4 cm. longa, tubo late obconico $1\frac{1}{2}$ cm. lato, limbo 5-lobato, lobis 5 rotundatis 2 cm. longis 3 cm. latis apice emarginatis basi cuneato-contractis. Stamina ∞ , exteriora 3 cm. longa, filamentis usque ad medium connatis. Ovarium glabrum conico-globosum $2\frac{1}{2}$ mm. latum 2 mm. longum, stylo filiformi 2 cm. longo apice trifido, ramis 2 mm. longis.

HAB. Giran: Taikotanzan, leg. S. NAKAI, Jan. 1915.

Near *Thea japonica*, but differs from it by the leaves which are, in this new species, generally broader, more shortly cuspidate and more minutely serrulate than those of the Japanese species. In dried specimens, the costae

of the leaves of the Formosan plant are generally not elevated, but those of the Japanese are prominently elevated.

Geraniaceæ.

Geranium LINN.

Geranium uniflorum HAYATA (Pl. III.) Fl. Mont. Formos. p. 65.

Rosaceæ.

Rubus LINN.

*Conspectus of the subgenera.**

- A. Fruticuli; caules solo adpressi aculeati. *Chamæbatus* I.
- B. Fruticosi; caules scandentes vel arcuato-prostrati.
 - α. Stipulæ latæ, liberæ vel subliberæ *Malachobatus* II.
 - β. Stipulæ lineares vel filiformes petiolo adnatæ ... *Idæobatus* III.

Subg. I. *Chamæbatus*.

Conspectus of the species.

- A. Leaves 3-lobed, branches manifestly aculeolate
 - 1. *R. pectinellus* var. *trilobus*.
- B. Leaves 5-lobed, nearly unarmed.
 - a. Leaves smaller 2-3 cm. in diameter; branches hirsute but not villose.....2. *R. calycinoides*.
 - b. Leaves larger 5 cm. in diameter; branches densely villose 3. *R. pentalobus*.

1. **Rubus pectinellus** MAXIM. var. **trilobus** KOIDZ. (Fig. 3-a). Conspect. Ros. Jap. p. 108.

R. pectinellus HAYATA (non MAXIM.) Fl. Mont. Formos. p. 80.

2. **Rubus calycinoides** HAYATA (Fig. 3-b) Ic. Pl. Formos. III. p. 88.

3. **Rubus pentalobus** HAYATA (Fig. 3-c) Fl. Mont. Formos. p. 80.

Subg. II. *Malachobatus*.

Conspectus of the species.

- A. Inflorescence terminal simple racemose, peduncles solitary.
 - a. Calyx and pedicels very slightly aculeolate ... 1. *R. Kawakamii*.
 - b. Calyx and pedicels densely aculeolate.

* FOCKE, W. O.—Species Ruborum, in Bib. Bot. XVII.—Heft 72.

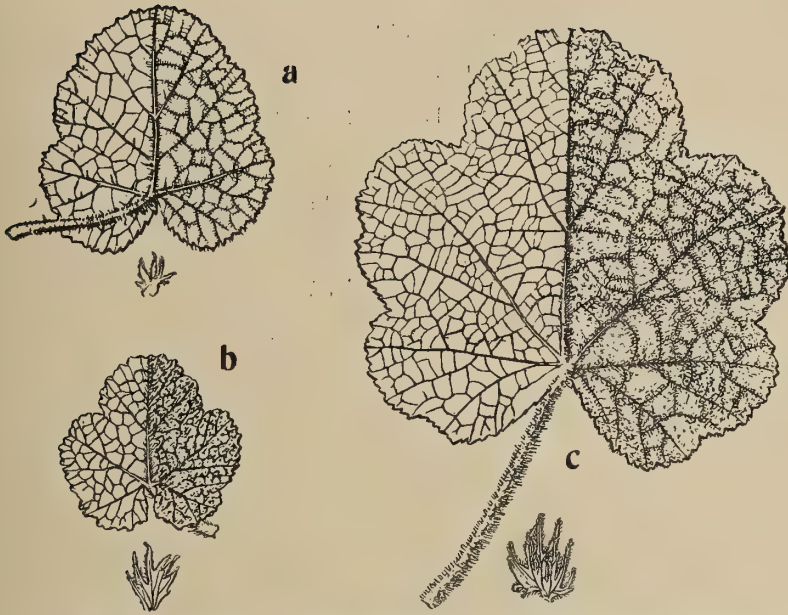


Fig. 3; a, *Rubus pectinellus* MAXIM. var. *trilobus* KOIDZ.; b, *R. calycinoides* HAYATA; c, *R. pentalobus* HAYATA.

- α. Leaves ashy-white beneath..... 2. *R. Swinhoei*.
 - β. Leaves not whitish beneath..... 3. *R. adenotrichopodus*.
 - B. Inflorescence variously paniculate, or flowers fasciculate, rarely solitary, axillary.
 - a. Leaves penni-nerved..... 4. *R. floribundopaniculatus*.
 - b. Leaves 3-5-nerved.
 - α. Leaves glabrous on both sides.
 - * Leaves aculeolate..... 5. *R. suishaensis*.
 - ** Leaves not aculeolate 6. *R. Morii*.
 - β. Leaves hairy beneath.
 - * Leaves rounded not or very slightly lobed. 7. *R. Shimadai*.
 - ** Leaves manifestly lobed.
 - * Leaves acute or caudate at the apex.
 - Leaves prominently reticulate. 8. *R. nantoensis*.
 - Leaves not reticulate... 9. *R. Lambertianus*.

** Leaves obtuse at the apex.

□ Leaves lanate... 10 *R. Rolfei* var. *lanatus*.

□□ Leaves tomentose

△ Leaves membranaceous.

...11. *R. alceaefolius* var. *emigratus*.

△△ Leaves coriaceous.

○ Stipules fimbriate from the base.

..... 12. *R. lasiniato-stipulatus*.

○○ Stipules obovate lacerate at the apex.

+ Leaves silky tomentose beneath.

.....13. *R. rugosissimus*.

++ Leaves tomentose beneath, not

silky.....14. *R. formosensis*

= *R. randaiensis*.

1. **Rubus Kawakamii** HAYATA (Fig. 4-a) Mater. Fl. Formos. p. 91.

Note: Calyx with purple spines; petals white or slightly purple.

2. **Rubus Swinhœi** HANCE (Fig. 4-b); MATSUM et HAYATA Enum Pl. Formos. p. 123.

3. **Rubus adenotrichopodus** HAYATA (Fig. 4-c) Ic. Pl. Formos. V. p. 49.

4. **Rubus floribundo-paniculatus** HAYATA (Fig. 5-a) Ic. Pl. Formos. III. p. 89.

Rubus suishaensis HAYATA sp. nov. (Fig. 5-b) Suffrutex; ramuli subglabri fulvo-rubescens teretes aculeolati, aculeis 2-3 mm. longis complanatis. Folia simplicia triangulari-ovata 8 cm. longa $5\frac{1}{2}$ cm. latus apice acuminatus basi late cordatus vel late truncatus tenuiter 3-lobatus vel haud lobatus margine tenuiter et simpliciter serrulatus, serrulis a se 3 mm. remotis brevissimis, utraque pagina subglabra sed supra ad costas dense subtus tenuiter hirsuta, costa subtus remote aculeolata, trinervia, petiolis $1-1\frac{1}{2}$ cm. longis aculeolatis plus minus hirsutis vel subglabris. Racemi axillares 1-2-florati basi bracteis 4-5 suffulti, bracteis ovatis vel ovato-rotundatis fulvo-rubescens 3-6 mm. longis coriaceis intus glabris extus hirsutis, rhachibus vel pedunculis villosis-

hirsutis. Calycis cupula extus dense villosa intus glabra ad centrum villosa ; calycis lobi oblongo-triangulares 5 mm. longi 3 mm. lati apice acuti ad acumen 1 mm. longum abeuntes basi haud contracti utraque pagine villosi. Petala rotundata longe unguiculata, unguibus $1\frac{1}{2}$ mm. longis $\frac{1}{2}$ mm. latis, lamina rotundata 4 mm. longa totiusque lata integra. Stamina ∞ , antheris

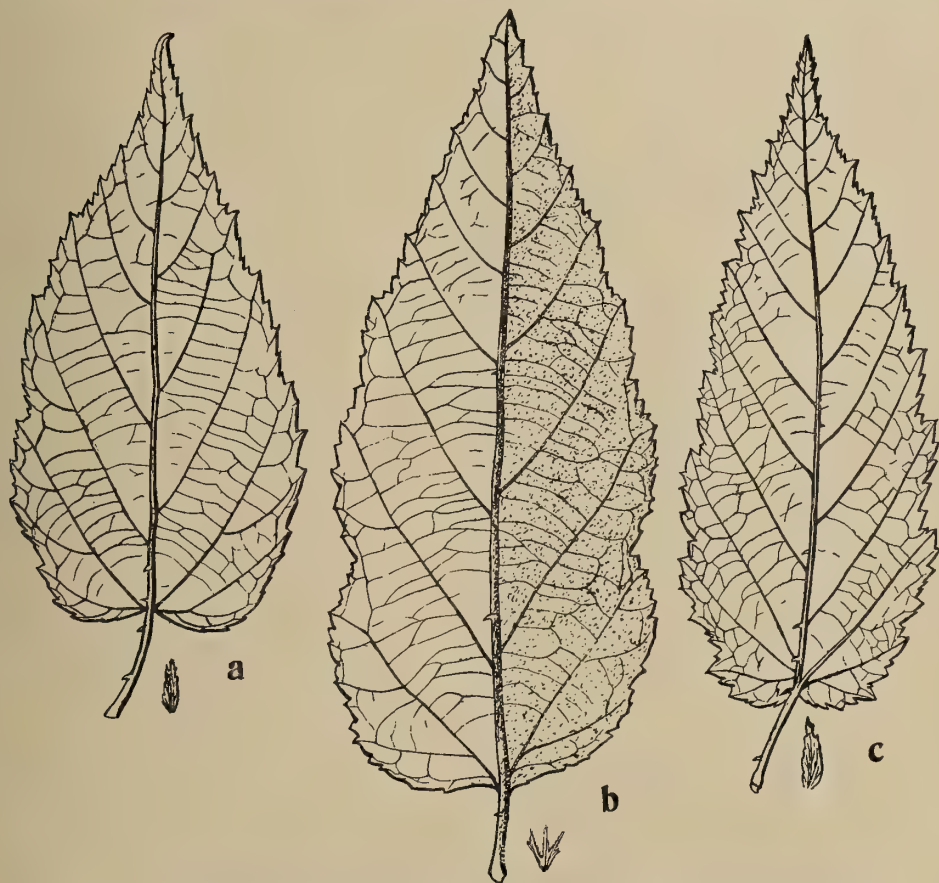


Fig. 4; a, *Rubus Kawakamii* HAY.; b, *R. Swinhoei* HANCE; c, *R. adenotrichopodus* HAY.

rotundato-ellipticis $\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis apice tenuiter basi alte lobatis. Receptaculum ovoideum sessile hirsutum. Ovarium semi-ovoideum 1 mm. longum dorso longe hirsutum, stylo $1\frac{1}{2}$ mm. longo glabro, stigmate terminali.

Rubus corchorifolius L. var. *glaber* MATSUM. in MATSUM. et HAYATA Enum. Pl. Formos. p. 121.

HAB. Holisha—Suisha, leg. C. OWATARI, Jan. 1898.

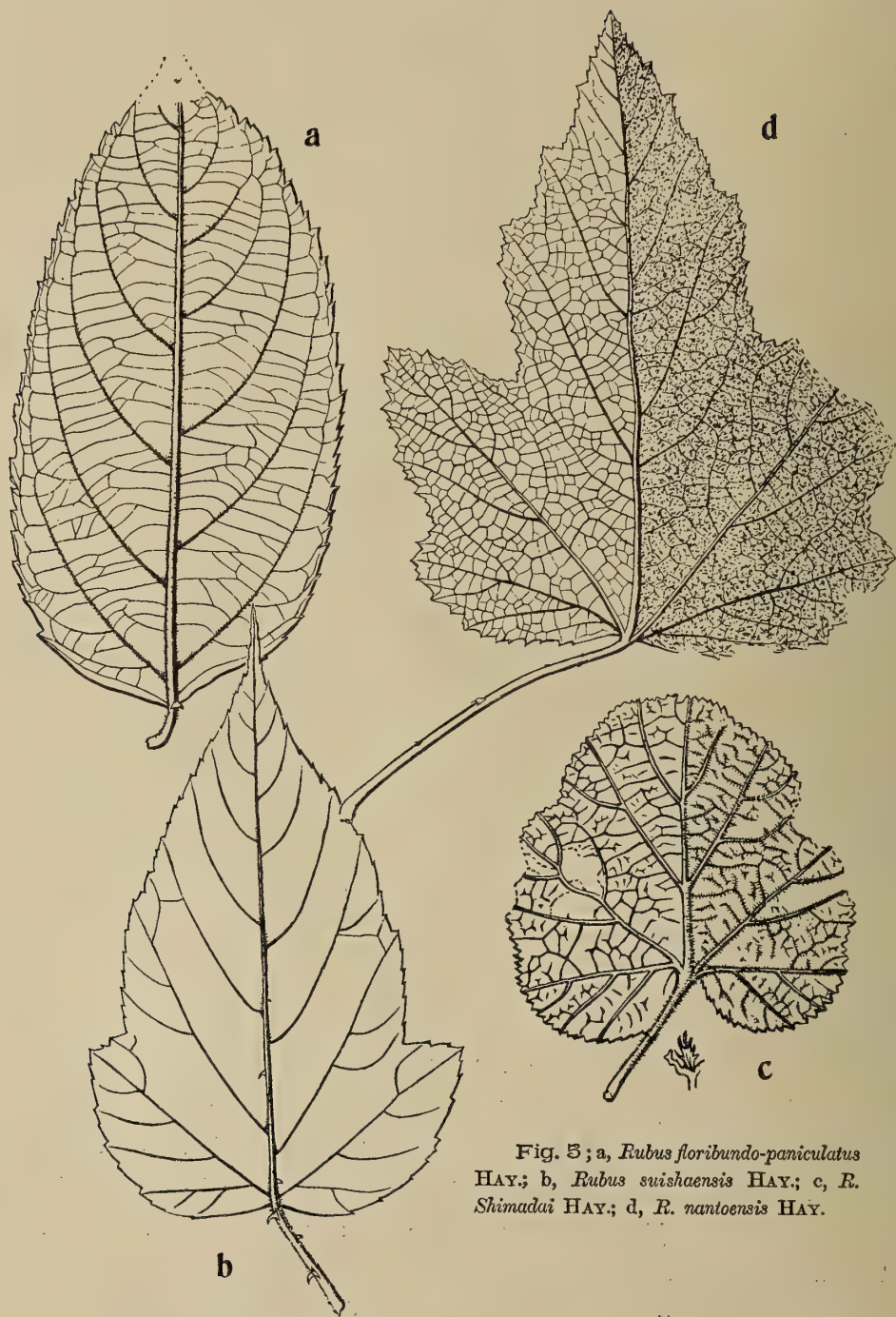


Fig. 5; a, *Rubus floribundo-paniculatus* HAY.; b, *Rubus suishaensis* HAY.; c, *R. Shimadai* HAY.; d, *R. nantoensis* HAY.

Near *R. corchorifolius*, but differs from it by the quite glabrous trinerved leaves.

6. **Rubus Morii** HAYATA Mater. Fl. Formos. p. 90.
7. **Rubus Shimadai** HAYATA (Fig. 5-c) Ic. Pl. Formos. III. p. 94.
8. **Rubus nantoensis** HAYATA (Fig. 5-d) Mater. Fl. Formos. p. 92.
9. **Rubus Lambertianus** SER. (Fig. 6-a) HAYATA et MATSUM. Enum Pl. Formos. p. 121.



Fig. 6; a, *Rubus Lambertianus* SER.; b, *Rubus Rolfei* VIDAL var. *lanatus* HAY.

10. **Rubus Rolfei** VIDAL var. **lanatus** HAYATA (Fig. 6-b) Fl. Mont. Formos. p. 81.

11. **Rubus alceaefolius** POIR? var. **emigratus** FOCKE (Fig. 7). Sp. Rub. p. 79; Koidz. Conspect. Ros. Jap. p. 161.

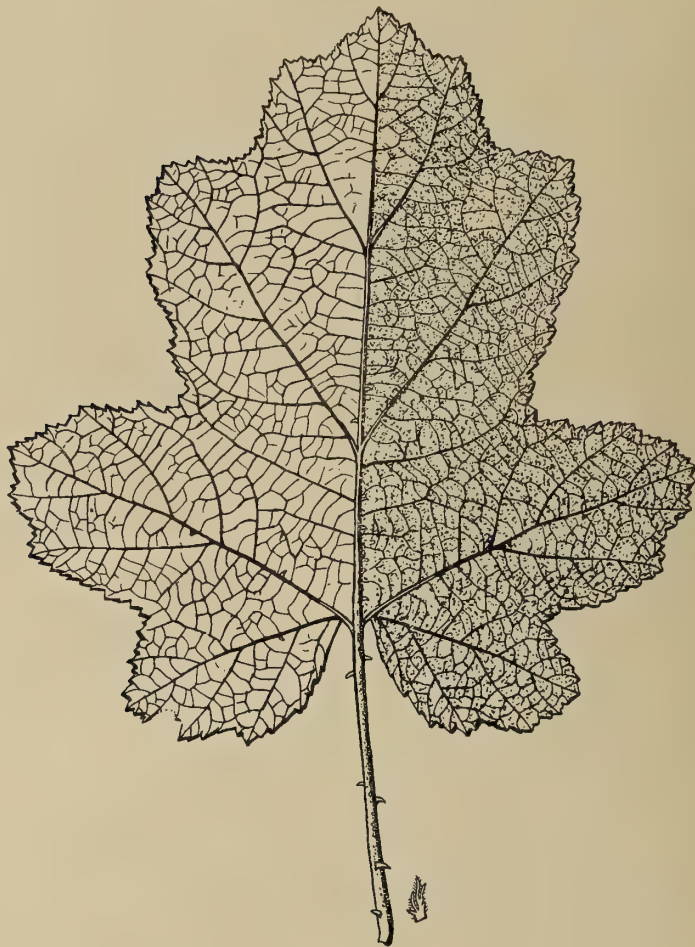


Fig. 7, *Rubus alceaefolius* POIR? Var. *emigratus* FOCKE.

12. **Rubus lasiniato-stipulatus** HAYATA (Fig. 8-a) Ic. Pl. Formos. III. p. 91. *R. moluccanus* HAYATA Ic. Pl. Formos. I. p. 228 (non LINN).
13. **Rubus rugosissimus** HAYATA (Fig. 8-b) Ic. Pl. Formos. III. p. 93.



Fig. 8; a, *Rubus lasiniato-stipulatus* HAY.; b, *Rubus rugosissimus* HAY.

14. **Rubus formosensis** O. KtZ. (Fig. 9); Focke Monogr. Rub. p. 117.
R. randaiensis HAYATA Mater. Fl. Formos. p. 93.



Fig. 9, *Rubus formosensis* O. KtZ.

Subg. III. *Idaeobatus*.

Key to the species.

A. Leaves simple

- a. Calyx greenish in living specimens, but turning black when dried, nearly glabrous on the back leaving the margin hairy, petals white usually reflexed.....1. *R. conduplicatus*=*R. retusipetala*.
- b. Calyx greenish in living specimens, but turning pale brown when dried, finely pubescent on the back or aculeolate on the back, petals white usually erect or semi-closed.
 - α. Calyx aculeolate on the back
 - *Leaves sinuately trilobed.....2. *R. taitoensis*.
 - **Leaves shallowly trilobed
 - Leaves cordate at the base.....3. *R. mingetsensis*.
 - Leaves truncate at the base...4. *R. aculeatiflorus*.
 - β. Calyx simply pubescent
 - *Carpels densely villose5. *R. arisanensis*.
 - 6. *R. arisanensis* var. *horishaensis*.
 - **Carpels less villose.....7. *R. shinkoensis*.

B. Leaves compound

- a. Very dwarf plant, erect, at most 10 cm. tall, leaflets small 1 cm. long quite glabrous.....8. *R. elegans*.
- b. Scandent, leaflets longer than 2 cm.
 - α. Stem, petioles, peduncles densely glanduloso-barbate.
 - *Leaves trifoliolate glabrous, terminal leaflets rounded nearly 10 cm. in diameter 9. *R. fasciculatus*.
 - **Leaves 3-7-foliolate hirsute, terminal leaflet oblong less than 5 cm. long.
 - Branches and petioles not velvety, simply glanduloso-barbate.10. *R. glanduloso-calycinus*.
 - Branches and petioles densely villose and glanduloso-barbate.
 - △Carpels hirsute.....11. *R. Somai*.
 - △△Carpels glabrous

- Syncarpium elliptical
.....12. *R. dolichocephalus*.
- Syncarpium rounded
 - +Primary veins manifestly impressed
above, elevate below.....
..... 13. *R. euphlebophyllus*.
 - ++Primary veins not manifestly im-
pressed above
 { 14. *R. piptopetalus*.
 { 15. *R. sphærocephalus*.
 { 16. *R. linearifolius* HAY.
- β. Stem, branches, petioles and peduncles not glanduloso-barbate.
 - Leaves glaucous velutinous on the lower surface
 - Leaflets smaller 1-2 cm. long.
.....17. *R. triphyllus*. = *R. parvifolius*.
 - Leaflets longer usually 5 cm. long.
 - △ Racemes terminal ...18. *R. parvi-araliifolius*.
 - △△ Cymes umbel-like axillary...19. *R. rarissimus*.
 - Leaves not glaucous velutinous below.
 - Leaves duplicately serrate
 - △ Branches and petioles villose
.....20. *R. taiwanianus*.
 - △△ Branches and petioles not villose
 - +Leaves quasiverticillate at the base of
the flowering branchlets
21. *R. parvipungens* = *R. hirsutopungens*.
 - ++Leaves simply alternate
 - Leaves more densely glandular dotted, .
carpels fewer than the following
species
..... 22. *R. glanduloso-punctatus*.
 - Leaves scarcely glandular dotted. ...
..... 23. *R. parvirosaefolius*.

- Leaves simply serrate, nearly glabrous
 ^Branches and petioles unarmed.....
 24. *R. kotoensis*.
 ^^Branches and petioles armed
 +Flowers axillary solitary.....
 25. *R. fraxinifolius*.
 ++Flowers in terminal or axillary cymes
 •Cymes many-flowered, leaves longer.
 26. *R. fraxinifolius*.
 ••Cymes few-flowered, leaves smaller...
 27. *R. parvifraxinifolius*.

1. **Rubus conduplicatus** DUTHIE (Fig. 10-a, a'); HAYATA Mater. Fl. Formos. p. 89; Ic. Pl. Formos. I. p. 224, t. 24 et V. p. 57. *R. retusipetalus* HAYATA Mater. Fl. Formos. p. 94.

Note: Flowers campanulate; petals white reflexed; sepals fresh-green.

2. **Rubus taitoensis** HAYATA (Fig. 10-b); Mater. Fl. Formos. p. 96.

3. **Rubus mingetsensis** HAYATA (Fig. 10-c); Ic. Pl. Formos. V. p. 40.

Note: scandent shrub, 1-2 m. long, scarcely branched; leaves fresh-green or dark-green, shining above, but very pale below; costa and veinlets impressed above but elevated below; pedicels and sepals pale fresh-green; petals very pale green or very pale yellow.

4. **Rubus aculeatiflorus** HAYATA (Fig. 12-a) Ic. Pl. Formos. V. p. 39.

5. **Rubus arisanensis** HAYATA (Fig. 12-b) Ic. Pl. Formos. III. p. 87.

6. **Rubus arisanensis** HAYATA var. **horishaensis** HAYATA n.v. (Fig. 12-c). Folia ovato-oblonga haud lobata vel leviter triloba 9 cm. longa 6 cm. lata apice margine duplicato-serrulata acuminata basi leviter cordata 3-nervia. Calyx viridis. Petala alba. Fructus tenuiter pubescens luteo-ruber vel rubr. Caeterum ut typica.

HAB. Baikei, ad 2000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Differs from the type by the leaves which are not at all or very slightly lobed.

Note: Leaves dark-green above, calyx fresh-green, petals white; carpels villose; fruits finely villose reddish yellow or red, when quite ripened.



Fig. 10, a, a', *Rubus conduplicatus* DUTHIE; b, *Rubus taiioensis* HAY.;
c, *Rubus migetsensis* HAY.

7. ***Rubus shinkoensis*** HAYATA (Fig. 12-d, d') Mater. Fl. Formos. p.

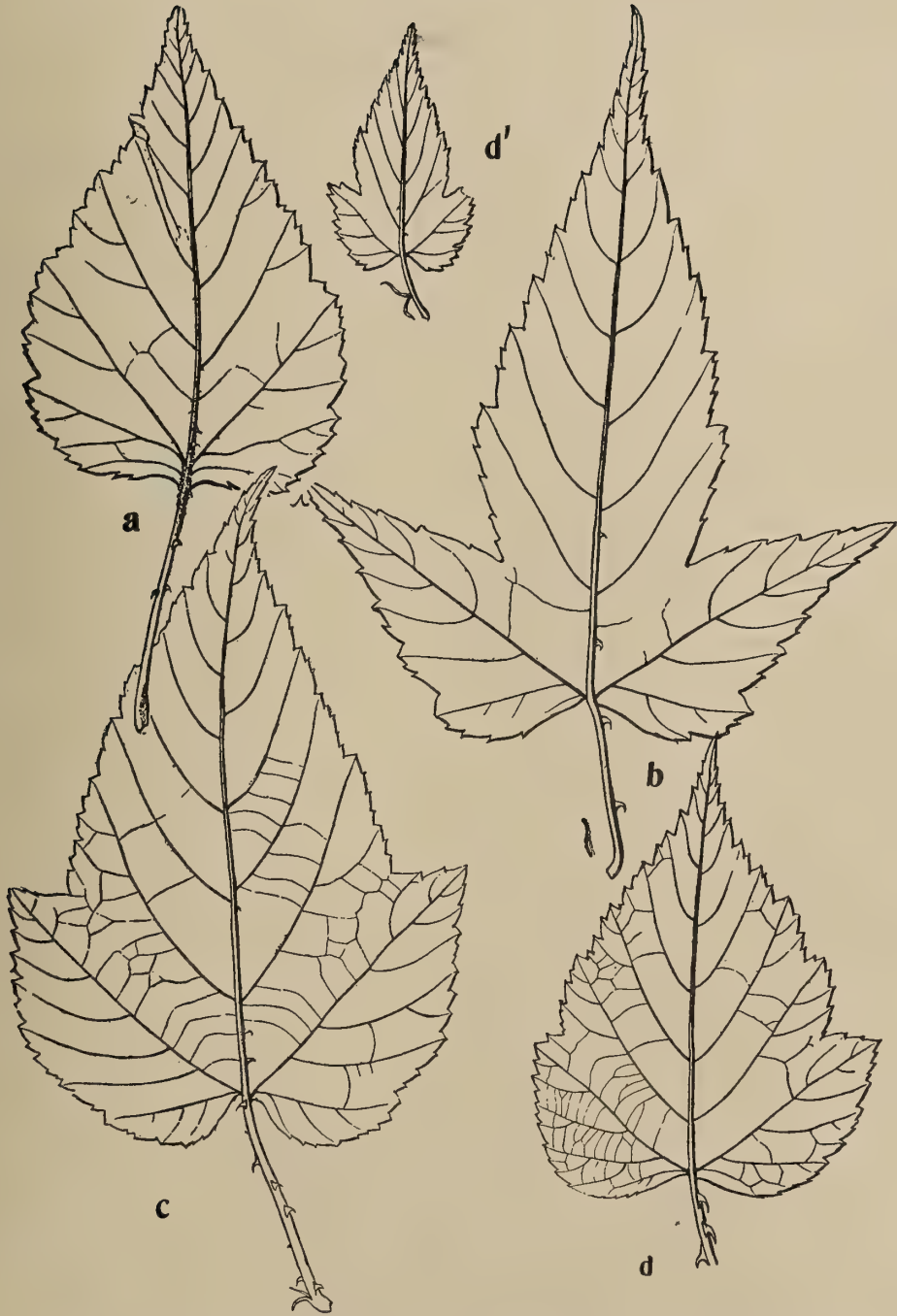


Fig. 12; a, *Rubus aculeatiflorus* HAY.; b, *Rubus arisanensis* HAY.; c, *Rubus arisanensis* HAY. var. *horishaensis* HAY.; d, d', *Rubus shinkoensis* HAY.

8. **Rubus elegans** HAYATA (Fig. 13-a) Fl. Mont. Formos. p. 79, t. IV.

9. **Rubus fasciculatus** DUTHIE (Fig. 13-b); HAYATA Mater. Fl. Formos. p. 90.

Note: Leaves dark-green shining above, costa and veins all impressed above but elevated below; prickles reddish; sepals pale-green; petals white.

10. **Rubus glanduloso-calycinus** HAYATA (Fig. 13-c) Ic. Pl. Formos. V. p. 42.



Fig. 13; a, *Rubus elegans* HAY.; b, *Rubus fasciculatus* DUTHIE;
c, *Rubus glanduloso-calycinus* HAY.

11. **Rubus Somai** HAYATA sp. nov. (Fig. 14-a) Suffrutex spinosus. Ramuli graciles teretes fulvo-rubescentes flexuosi spinosi et tenuiter villosi, pilis fulvo-rubescensibus apice glanduliferis. Folia alterna pinnata in ambitu ovata cum petiolis 15-20 cm. longa 10-13 cm. lata 5-foliolata rarius 3-foliolata, foliolo terminali maximo ovato-oblongo vel ovato-lanceolato 6-8 cm. longo 2-3 cm. lato apice acuminato basi rotundato duplicato-serrulato supra minus subtus plus velutinoso subtus ad costam minute remoteque aculeolata, petiolulo terminali 1-2 cm. longo, foliolis lateralibus ovato-lanceolatis infimis majoribus quam foliolo terminali et superioribus minoribus oppositis, jugis a se 2-3 cm. remotis; rachis foliorum glanduloso-hirsuta spinosa supra sulcata, spinis recurvis 1-2 mm. longis, petiolis communibus 2-5 cm. longis, stipulis inferiore adnatis superiore linearibus hirsutis. Calyx-cupula circ. 8 mm. in diametro intus ad centrum villosa caeterum glabra extus hirsuta; calycis lobi cum cuspidibus $1\frac{1}{2}$ cm. longi 5 mm. lati oblongo-triangulares apice longe cuspidati, cuspidibus linearibus 5 mm. longis, utraque velutinosi basi haud vel vix contracti margine integri. Petala non satis nota extus hirsuta basi breve unguiculata. Stamina ∞ , antheris ellipticis 1 mm. longis apice emarginatis basi 2-lobatis. Receptaculum fructus ellipsoideum 6 mm. longum 3 mm. latum hirsutum. Pseudosyncarpium oblongum 7 mm. latum. Achaeonium semioblongum latere complanatum 2 mm. longum 1 mm. latum ruguloso-reticulatum apice dorso hirsutum.

HAB. Banchoryō, leg. T. SōMA, Mart. 1914, No. 917.

Near *R. piptopetalus* HAYATA; but differs from it in having hirsute carpels.

12. **Rubus dolichocephalus** HAYATA (Fig. 14-b) Ic. Pl. Formos. III. p. 92.

NOTE: petals white; pistils fresh-green; fruits reddish-yellow; carpels botryoidal at the tip.

13. **Rubus euphlebophyllus** HAYATA (Fig. 14-c) Ic. Pl. Formos. V. p. 44.



Fig. 14; a, *Rubus Somai* HAY.; b, *Rubus dolichocephalus* HAY.;
c, *Rubus euphlebophyllus* HAY.

14. **Rubus piptopetalus** HAYATA (Fig. 15-a) Ic. Pl. Formos. V. p. 51.
15. **Rubus sphaerocephalus** HAYATA (Fig. 15-b); Ic. Pl. Formos.
III. p. 94.



Fig. 15; a, *Rubus piptopetalus* HAY.; b, *Rubus sphaerocephalus* HAY.

16. **Rubus linearifoliolus** HAYATA sp. nov. (Fig. 16-a) Suffrutex scandens. Ramuli recti teretes glanduloso-viscosi fulvo-rubescences aculeati aculeis rectis 3-4 mm. longis complanatis acuminatis recto-patentibus. Folia pallido-viridia pinnata in ambitu lanceolata cum petiolo 20-25 cm. longa 10-15 cm. lata, foliolo terminali lineari-lanceolato 5-6 cm. longo 8 mm. lato apice acuminato basi obtuso margine duplicato-serrulato utraque glabro, costa subtus aculeolata supra laevi, foliolis lateralibus eo terminali conformibus oppositis 3-5 jugis a se 3-4 cm. remotis, petiolis cum rhachibus glabris sed viscosis aculeatis, aculeis deorsum recurvis, stipulis usque ad medium ad petiolum adnatis linearibus 5 mm. longis. Racemi pauciflorati, floribus 1-2, axillares vel terminales, pedunculis vel pedicellis 1-2 cm. longis viscosis plus minus aculeo latis. Calyx pallido-viridis; calycis cupula extus glabra sed viscosa 7 mm. in diametro ad centrum plus minus depressa; calycis lobi triangulares 6 mm. longi 4-5 mm. lati apice acuti subito ad acumen linearem 7 mm. longum abeuntes extus viscosi prope marginem hirsuti intus villosi. Petala alba obovato-rotundata 12 mm. longa 8-9 mm. lata apice rotundato-truncata basi obtusa vel plus minus cuneata margine subintegra versus apicem plus minus crenulata vel integra. Stamina ∞ , antheris ellipticis 1 mm. longis $\frac{1}{2}$ mm latis utroque emarginatis. Cupula intus glabra ad centrum villosa. Receptaculum ellipsoideum. Ovarium oblique oblongum, stylo glabro, stigmate terminali.

HAB. inter Nanko et Dainanō, leg. B. HAYATA, Mai. 1916.

Near *R. rosaefolius* SM., but differs from it by the linear leaflets.

17. **Rubus triphyllus** THG. (Fig. 16-b); Koidz. Conspect. Ros. Jap. p. 137. *R. parvifolius* MIQ.; MATSUM. et HAYATA Enum. Pl. Formos. p. 122.

Note: petals purple.



Fig. 16; a, *Rubus linearifolius* HAY.; b, *Rubus triphyllus* THUNB.

18. **Rubus parvi-araliifolius** HAYATA (Fig. 17) Ic. Pl. Formos. V. p. 48.



Fig. 17; *Rubus parviaraliifolius* HAY.

19. **Rubus rarissimus** HAYATA (Fig. 18) Ic. Pl. Formos. VI. p. 16.



Fig. 18; *Rubus rarissimus* HAY.

20. **Rubus taiwanianus** MATSUM. (Fig. 19-a) in MATSUM. et HAYATA Enum. Pl. Formos. p. 123.

21. **Rubus parvipungens** HAYATA (Fig. 19-b) Ic. Pl. Formos. V. p. 56. *R. hirsutopungens* HAYATA Ic. Pl. Formos. V. p. 58.

22. **Rubus glandulosopunctatus** HAYATA (Fig. 19-c) Ic. Pl. Formos. IV. p. 5.

23. **Rubus parvirosaeifolius** HAYATA (Fig. 19-d) Ic. Pl. Formos. V. p. 54.



Fig. 19; a, *Rubus taiwanianus* MATSUM.; b, *Rubus parvipungens* HAY.; c, *Rubus glandulosopunctatus* HAY.; d, *Rubus parvirosaeifolius* HAY.

24. **Rubus kotoensis** HAYATA (Fig. 20) Ic. Pl. Formos. III. p. 90.



Fig. 20; *Rubus kotoensis* HAY.

25. **Rubus fraxinifoliolus** HAYATA (Fig. 21) Ic. Pl. Formos. V. p. 46.



Fig. 21; *Rubus fraxinifoliolus* HAY.

Note: Climbing glabrous shrub; leaves dark-green; calyx green; petals white; anthers dark-brown.

26. **Rubus fraxinifolius** POIR. (Fig. 22-a); MATSUM. et HAYATA Enum Pl. Formos. p. 121.

27. **Rubus parvifraxinifolius** HAYATA (Fig. 22-b) Ic. Pl. Formos. V. p. 52.

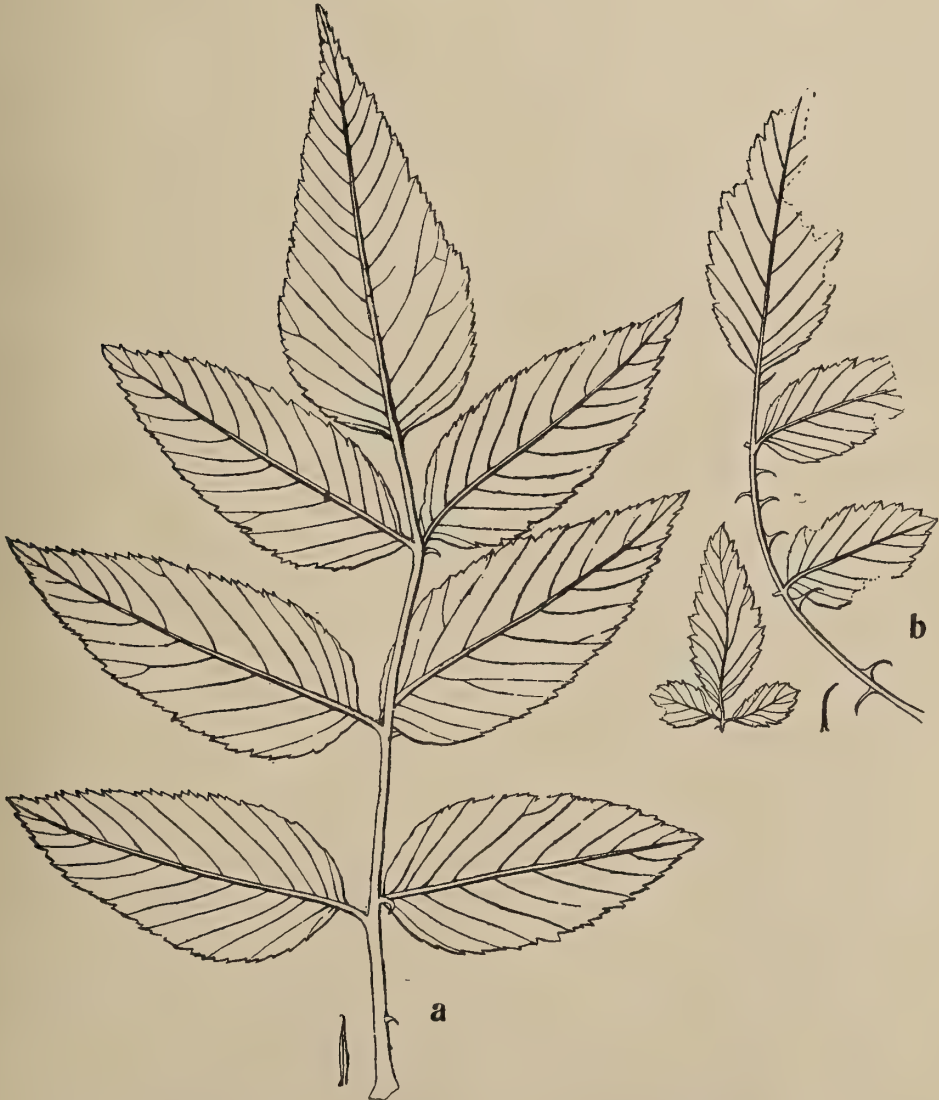
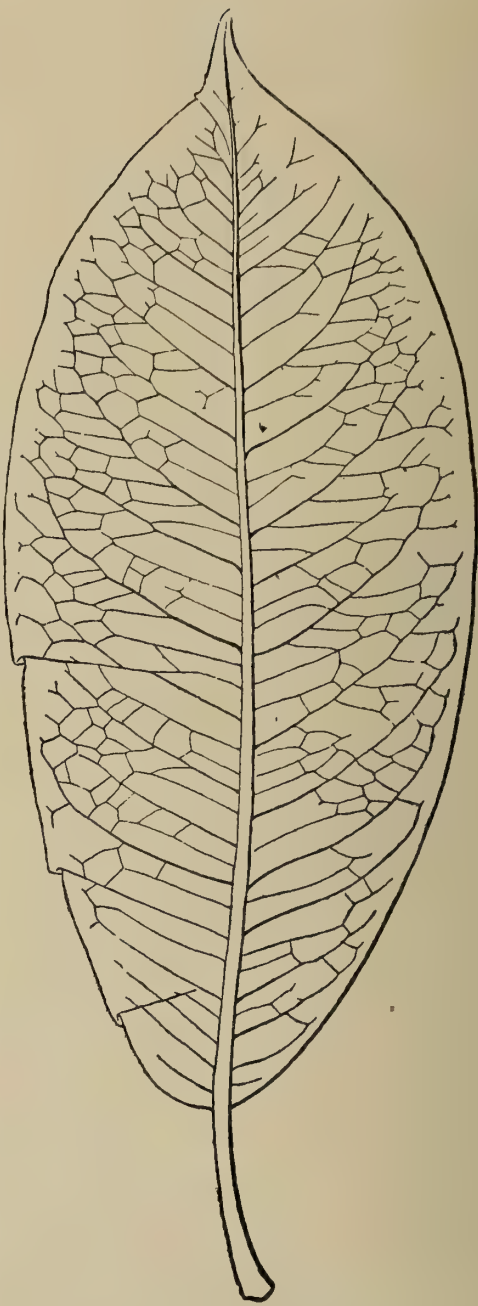


Fig. 22, a, *Rubus fraxinifolius* POIR.; b, *Rubus parvifraxinifolius* HAY.

Photinia LINDL.***Photinia daphniphyloides***

HAYATA sp. nov. (Pl. IV. et Fig. 23).

Frutex 10–15 ped. altus dense ramosus; ramulis validiusculis primum tomentosis damum glabris. Folia alterna oblonga coriacea glabra 14 cm. longa 6 cm. lata apice subito cuspidato-acuta ad summum breve aristata basi obtusa vel obtusotruncata margine integra, costa supra impressa subtus elevata, venis lateralibus primariis utroque latere costæ 15–16 gracillimis supra haud subtus tenuiter elevatis, venulis gracillimis subtus elevato-reticulatis, supra nitida atroviridia subtus glaucescentia, petiolis 3 cm. longis hirsutis. Flores cymoso-paniculati, paniculis terminalibus 7 cm. longis totiusque latis, pedunculis et ramis tomentosis apice dense floratis, pedicellis glabris 2–4 mm. longis. Calyx extus glaber obconicus vel obcampanulatus 1 mm. longus 3 mm. latus 5-lobatus, lobis semi-rotundatis $\frac{2}{3}$ mm. longis 1 mm. latis apice rotundatis coriaceis margine membranaceis integris. Petala 5 alba late rotundata $2\frac{1}{3}$ mm. longa totiusque lata apice rotundata basi breve unguiculata. Stamina 13–15 ad basin loborum calycis affixa, filamentis glabris, antheris rotundato-

Fig. 23, *Photinia daphniphyloides* HAYATA.

reniformibus $\frac{1}{2}$ mm. in diametro. Ovarium apice conicum liberum dense albo-barbatum 2-loculare, loculis 2-ovulatis.

HAB. Inter Shingio et Batakan, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Comparable to some extent to *P. integrifolia*, but differs from it by the villose carpels.

Caprifoliaceæ.

Abelia R. BR.

Abelia ionandra HAYATA sp. nov. (Pl. V.)=*A. chinensis* HAYATA Mater. Fl. Formos. p. 138 (non R. BR.). Frutex 1-2 m. altus; rami cinescentes graciles teretes, cortice longitudinaliter fisso, ramulis gracillimis rectis toto foliatis rubescentibus breve pubescentibus. Folia opposita rhomboideo-ovata 2 cm. longa $1\frac{1}{2}$ cm. lata apice triangulari-acuta basi rotundato obtusa margine minute remoteque mucronibus utroque latere 5-6 instructa apice mucronata, costa supra impressa subtus elevata, supra viridia subtus pallidissima, venulis reticulatis. Cymae 2-floratae versus et ad apicem ramulorum quasi-fasciculatim aggregatim dispositae; pedunculi vel pedicelli 4-5 mm. longi hirsuti medio bracteis oppositis 2 instructi, (bracteis hirsutis spathulatis $1\frac{1}{2}$ -2 mm. longis concavis apice obtusis basi haud contractis) apice bracteis 6 radiatim dispositis instructi, bracteis $1\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis margine ciliatis. Flores geminatim ad apicem pedicelli cymae dispositi sessiles. Ovarium inferum (vel tubus calycis) 6 mm. longum ovato-fusiforme hirsutum $1\frac{1}{2}$ mm. latum multi-sulcatum. Limbus calycis 5-partitus, partibus patentibus aequalibus 4-6 mm. longis 1-2 mm. latis spathulatis apice obtusis basi attenuatis margine integris coliolatis pallido-viridi-flavis chartaceo-membranaceis nervosis, nervis dorso elevatis plus minus hirsutis. Corolla longe tubulosa versus apicem campanulata 13 mm. longa, limbo 6 mm. lato, tubo medio $1\frac{1}{2}$ mm. lato apicem gradatim ad limbum abeunti, extus tenuiter hirsuta intus dense hirsuta fere regularis vel plus minus 2-labiata, labio superiore 2-lobato, lobis semirotundatis $1\frac{1}{2}$ mm. longis 2 mm. latis apice rotundatis margine integris ciliolatis, labio inferiore 3-lobato, lobis lateralibus cum lobo labii superioris conformibus, lobo medio

plus minus longiore oblongo $2\frac{1}{2}$ mm. longo $2\frac{1}{3}$ mm. lato apice rotundato basi haud contracto margine glanduloso-ciliolato, lobis totis reticulato-nervosis. Stamina 4 exserta versus basin corollae affixa, partibus liberis filamentorum 10 mm. longis glabris, antheris ellipsoideis $1\frac{2}{3}$ mm. longis $\frac{1}{2}$ mm. latis utroque emarginatis glabris purpureis. Stylus inclusus 10 mm. longus glaber erectus apice late campanulatus $\frac{2}{3}$ mm. latus.

HAB. Inter Busegan et Seisui, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Near *Abelia Aschersoniana* and *A. chinensis*; but differs from the former by the much larger leaves, and from the latter by the quite obtuse and shortly apiculate, but never acuminate, leaves.

Rubiaceæ.

Nertera BANKS et SOL.

Nertera nigricarpa HAYATA (Pl. VI.) Fl. Montana Formos. p. 115.

HAB. Bonbonsha, leg. B. HAYATA, Mai. 1917.

Near *Nertera depressa* BANKS et SOL. (Bot. Mag. t. 5799); but differs from it by the entire corolla-lobes and black fruits.

Galium LINN.

Galium Morii HAYATA sp. nov. (Fig. 24) Caulis ascendens 5 cm. altus toto foliatus glaber vel inferne sparce pilis retrosis conspersus, internodiis superioribus longioribus 8 mm. longis, inferioribus brevioribus 2 mm. longis. Folia inferiora minora 1 mm. longa, superiora majora 3 mm. longa 4-quasiverticillata, superiora majora oblonga $3\frac{1}{2}$ mm. longa $2\frac{1}{2}$ mm. lata apice apiculato-acuta basi obtusa haud petiolata sessilia margine integra 3-nervia, nervis supra elevatis ad nervos pilis setuliformibus parce conspersa, nervis subtus haud elevatis. Cyma pauciflorata fere terminalis; fructus reniformis setulis uncinatis superiore interiore recurvis conspersus.

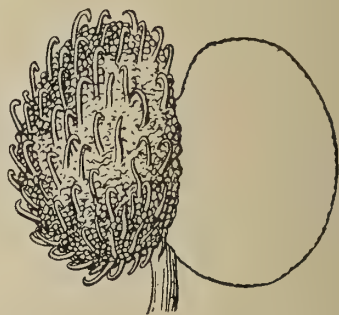


Fig. 24, *Galium Morii* HAYATA.

HAB. Mt. Morrison, leg. U. Mori, Dec. 1908. Remarkable for its small form with rounded leaves and stipules.

Galium tarokoense HAYATA sp. nov. (Pl. VII.) Herba glabra 8 cm. alta. Caulis decumbens vel ascendenti-erectus aggregatim situs basi ramosus toto foliatus. Folia cum stipulis quasi-4-verticillata rhomboideo-oblonga cum petiolis 1 mm. longis 6 mm. longa 2 mm. lata apice triangulari-obtusa basi subito attenuata petiolum 1 mm. longum $\frac{1}{3}$ mm. latum formantia margine integra tenuiter deorsum recurva chartacea costa, supra distincte tenuiter elevata subtus haud elevata; nodi caulis ad basin petiolorum plus minus pilis setuliformibus instructi; internodiis 6 mm. longis. Cymae 3-5-floratae axillares vel terminales glabrae; pedicellis ultimis 1 mm. longis. Calycis lobi 0. Corolla rotata 4-partita, partibus valvatis triangulari-oblongis $1\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice acutis basi haud vel leviter contractis utraque glabris; parte corollae centrali non partita $\frac{1}{2}$ mm. in diametro. Stamina 4 ad limbum inter lobos affixa, filamentis $\frac{1}{2}$ mm. longis glabris, antheris oblongis. Stylus brevissimus 2-partitus. Ovarium globoso-reniforme dense setulis superiore recurvis conspersum.

HAB. inter Shinjō et Batakan, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Larger than the preceding species from which this is distinguishable by the quite glabrous, more or less petiolate leaves.

Ebenaceæ.

Diospyros LINN.

Diospyros Sasakii HAYATA sp. nov. (Pl. VIII.). Arborescens 20 ped. alt. Ramuli graciles fusco-purpurascens teretes lenticellis minutis conspersi. Folia alterna membranacea lanceolata vel ovato-lanceolata 9 cm. longa 3 cm. lata apice acuminata basi acuta vel rotundata margine subintegra, costis venis venulis supra leviter impressis subtus leviter elevatis tenuibus, venis lateralibus gracillimis, reticulis subtus distincte visis, toto glabra, petiolis 1 cm. longis glabris gracilibus intus sulcatis. Flores ♂ breve racemosi, racemis 4-5 floratis ad summum 1 cm. longis glabris, pedicellis 2-5 mm. longis glabris. Calyx late obconicus viridis alte 4-lobatus extus glaber, lobis oblongo-triangularibus $2\frac{1}{2}$ mm. longis 2 mm. latis apice obtusis basi haud contractis margine integris extus glabris intus hirsutis. Corolla urceolata 6 mm. longa

3½ mm. lata extus glabra intus barbata alba apice 4-lobata, lobis intus rubro-violascentibus late rotundatis 1¼ mm. longis 2 mm. latis apice rotundatis ad centrum leviter sinuatis basi plus minus contractis extus glabris intus barbatis. Stamina 14-16 basi corollae affixa, filamentis brevibus plus minus barbatis, antheris lanceolatis inæqualibus, longioribus 3 mm. longis, brevioribus 2 mm. longis ⅔ mm. latis apice acuminatis basi obtusis vel rotundatis plus minus barbatis. Rudimentum ovarii incrassatum 1 mm. longum totiusque latum 4-lobatum glabrum.

HAB. inter Batakan et Uchitaroko, leg. S. SASAKI et B. HAYATA, Aprili. 1917.

Near *D. Morrisiana* HANCE (BENTH. Fl. Hongk. p. 210); but differs from it by the notched lobes of the corolla.

Euphorbiaceæ.

Euphorbia LINN.

Euphorbia tarokoensis HAYATA sp. nov. (Pl. IX.) Herba toto glabra annua basi suffrutescens circ 30 cm. alta. Caulis erectus rectus teres glaber pallido-viridis simplex haud ramosus (excepta inflorescentia), basi haud-foliatus a basi sursum usque ad apicem foliatus. Folia alterna approximativ sita sessilia linearia 4-5 cm. longa 3-4 mm. lata versus apicem latiora quam basi apice obtusissima rotundata sed ad centrum apicis brevissime apiculata basi obtusa toto glaberrima margine integerrima tenuissime deorsum recurva, costa supra leviter impressa subtus prominente elevata. Cymæ ad folia superiora axillares et terminales paniculam pyramidalem formantes, paniculis 10-13 cm. longis 8-10 cm. latis; cymis longe pedunculatis, pedunculis 3-4 cm. longis rectis ascendentibus vel patentibus apice furcatim 2-ramosis, ramis apice involucra florum 2 gerentibus, ad ramificationem bracteis 2 instructis, bracteis ordinis primarii rhomboideis vel reniformibus 8-10 mm. longis, 5-10 cm. latis oppositis; bracteis ordinis secundarii semper reniformibus 6 mm. longis 8 mm. latis apice breve apiculatis. Involucrum sessile vel brevissime pedicellatum urceolato-campanulatum extus glabrum 1½ mm. longum 2 mm. latum ad orem glandis 4 instructum, glandis semi-oblongis latere exteriori truncatis denticulato-crenulatis crassiusculis; lobi involucri glandis alterni

interiore recurvi semi-rotundati $\frac{1}{2}$ mm. longi $\frac{1}{2}$ mm. lati margine hirsuti. Fl ♂ 10–15 in involucre inclusi, stamina 1, filamentis $\frac{1}{4}$ mm. longis, antheris reniformibus basi apiceque 2-lobatis; bracteis inter stamina laciniatis. Ovarium longe stipitatum exsertum globosum trilobum, stylis trifidis, segmentis 2-ramosis.

HAB. inter Batakan et Uchitaroko, leg. B. HAYATA et S. SASAKI, Aprili. 1917.

Comparable to some extent to *Euphorbia pekinensis*, but differs from it by the much smaller form with perfectly entire leaves and denticulate glands on the involucre.

Urticaceæ.

Ficus LINN.

Ficus kaukauensis HAYATA sp. nov. Arbor. Rami et ramuli cinereo-rubescens cicutricibus foliorum rotundatis et cicutricibus stipularum annuliformibus remote notati, cortice longitudinaliter rugoso, lenticellis haud manifestis. Folia alterna obovato-oblonga vel oblonga 11–16 cm. longa 6–10 cm. lata apice breve acuminata vel breve cuspidata basi versus extremitatem subito cuneata margine integra vel subintegra coriacea utraque; glabra, costis venisque supra tenuiter elevatis vel rarius impressis subtus distincte elevatis rubro-coloratis venis lateralibus primariis utroque latere costæ 7–8 arcuatis sursum furcatis, petiolis 2–2 $\frac{1}{2}$ cm. longis teretibus glabris supra tenuiter sulcatis; stipulis caducis ovato-lanceolatis 3 cm. longis 1 cm. latis apice acuminatissimis basi subtruncatis. Receptaculum florum galliferorum versus apicem ramorum lateraliter solitariter vel geminatim dispositum depressoglobosum circ. 2 cm. in diametro 14 mm. longum apice plus minus convexum basi depressum circ. 10–costatum fulvescens minute verrucoso-lenticellatum basi bracteis 3 instructum, bracteis brevissimis 1 $\frac{1}{3}$ mm. longis circ. 3 mm. latis late triangularibus apice subrotundatis vel obtusis; bracteis circum orem apicis receptaculi semi-rotundatis multis imbricatis. Flores galliferi longe stipitati vel sessiles; perianthia subgamophylla ad ovarium arcte adnata et id includentia membranacea. Ovarium oblique obovoideum 1 $\frac{1}{2}$ mm. longum, stylo laterali ascendenti 1 mm. longo, stigmate truncato.

HAB. Kaukaukei, leg. B. HAYATA, Mai. 1916.

Near *F. Konishii* HAY., but separable from it by the leaves which are obovate with very cuneate base.

***Ficus ochobiensis* HAYATA** sp. nov. Arbor. Rami crassiusculi, ramulis rubro-purpurascens. Folia oblonga chartacea vel chartaceo-membranacea 10–13 cm. longa 4–6 cm. lata apice brevis cuspidata ad summum obtusa basi acuta vel cuneata margine subintegra a medio deorsum integra a medio sursum obscure undulata plana, præsertim sub cuspidibus manifeste repanda, vel toto subintegra supra haud nitida subtus pallida, costis venis supra subplanis haud distinctis subtus tenuiter elevatis rubro-coloratis manifeste distinctis, venulis reticulatis subtus distincte visis, venis lateralibus primariis utroque latere costæ 6–7 arcuatis sursum furcatim ramosis, utraque pagine glaberrima, petiolis 7–15 mm. longis sparse hirsutis, stipulis caducis ovatis vel elongato-ovatis 18 mm. longis 8 mm. latis apice acutis basi truncatis. Receptaculum depressoglobosum (immaturum?) ad ramos vel truncos glomeratim dispositum stipite 3 mm. longo instructum 12 mm. longum 7 mm. latum plus minus verrucosum vel læve apice depressum basi convexum basi bracteis 3 instructum, bracteis late triangularibus connatis peltam triangularem 6 mm. in diametro formantibus apice obtusis margine subintegris vel minute denticulatis vel ciliolatis; bracteis circum orem ∞ -seriatim dispositis triangularibus vel oblongis margine ciliolatis.

HAB. Ōchōbi, leg. B. HAYATA; Mai. 1916.

Near *F. Konishii* HAY., but differs from it in having leaves with much acuter base. Also comparable to *F. Harlandi*, but distinguishable from it in having much thinner leaves (with more or less cuspidate tip. Also near *F. fistulosa* REINV. (KING. t. 150) by the leaves with much narrower base.

***Ficus tannoensis* HAYATA** sp. nov. Suffrutex humilis a basi ramosus, ramis teretibus gracillimis simplicibus vel pauca ramosis scandentissimis generaliter haud ramulosis rubro-purpurascens longitudinaliter rugulosis, cortice tenuissimo longitudinaliter fissis et soluto fere toto longitudine foliosis, 30–100 cm. longis 1–2 mm. in diametro sectionis. Folia linearia $2\frac{1}{2}$ –10 cm. longa $2\frac{1}{2}$ –9 mm. lata apice acuminatissima basi obtusa vel truncata vel auriculato-dilatata margine integra, supra in exsicco fusca subtus pallida

utraq.ue pagine subglabra vel supra sparce hirsuta subtus sub lente minute atro-punctata, costis venis utraq.ue vix vel haud elevatis, venis supra haud visis subtus distincte visis, tenuiter 3-nervia, nervis lateralibus tenuissimis brevissimis subrectis a costa angulo 45° egressis prope marginem subito sursum arcuatis, venis lateralibus utroque latere costæ circ. 20 vel plus numerosis a costa angulo 90° divaricatis prope marginem venis marginalibus connexis, venis marginalibus a margine $\frac{1}{2}$ –1 mm. distantibus, petiolis subteretibus $\frac{1}{2}$ –8 mm. longis hirsutis, stipulis castaneis membranaceis lineari-lanceolatis 2–7 mm. longis acuminatis glabris caducissimis basi dilatatis caulem semi-amplectantibus; folia interdum anomala obovato-cuneata 1 cm. longa obscure 3-lobata. Receptaculum solitarium axillare stipitatum, stipite 3–5 mm. longo. Receptaculum (floribus galliferis et masculinis) subgloboso-urceolatum 13 mm. longum 12 mm. latum laeve glabrum basi 3-bracteatum, bracteis late triangularibus $1\frac{1}{2}$ mm. latis minus quam 1 mm. longis apice obtusis margine ciliolatis; receptaculum apice urceolato-depressum, bracteis circum orem elevato-convexo-dispositis ∞ -seriatis triangulari-rotundatis 2 mm. latis $1\frac{1}{2}$ mm. longis haud costatis minute ciliolatis. Flores galliferi sessiles vel stipitati, perianthia 4-partita, segmenta linearia atro-castanea $2\frac{1}{2}$ mm. longa $1\frac{1}{2}$ mm. lata apice acuta; ovarium oblique globosum minus quam 1 mm. in diametro, stigma laterale. Flores masculini, staminibus 1–3, perianthiis 4-partitis, antheris 2-loculatis oblongis $1\frac{1}{4}$ mm. longis minus quam 1 mm. latis utrinque emarginatis, filamentis $\frac{2}{3}$ mm. longis.

HAB. Tanno, leg. B. HAYATA, Mai. 1916.

Very distinct for the very slender scandent habit of the species.

Cupuliferæ.

Quercus LINN.

Quercus Sasakii KANEHIRA (Pl. X.) in HAYATA Ic. Pl. Formos. VI. p. 64.

Quercus spinosa A. DAVID var. ***Miyabei*** HAYATA n. v. *Quercus Miyabei* KAWAKAMI in lit. Frutescens. Ramuli fusco-purpurascens parce lenticellati versus summum stellato-tomentosi dense foliati validiusculi. Folia coriacea ellipsoidea rarius obovato-ellipsoidea $5\frac{1}{2}$ cm. longa $3\frac{1}{2}$ cm. lata apice rotundata basi leviter cordata margine integerrima vel remote spinosa, costa

supra leviter elevata subtus prominente elevata, venis primariis lateralibus utroque latere costae 7, mediis 50° infimis 90° a costa egressis subtus elevatis, supra glabra subtus ad basin costae stellato-tomentosa caeterum glabra, petiolis brevissimis 5 mm. longis plus minus tomentosis. Cupula.....

HAB. in montibus centralibus, leg. U. MORI, Dec. 1909.

The species was first named as *Quercus Miyabei* by the late T. KAWAKAMI, but the name was not published, as it was then considered to be identical with *Quercus spinosa* DAVID. In examining again the species and in comparing it closely with *Q. spinosa*, I have found that there are some difference between the two. The leaves of the present *Quercus* are usually elliptical or very slightly obovate-elliptical, while those of *Q. spinosa* are always obovate. Moreover, the leaves of the former are nearly plain on the upper surface, while those of the latter are very much impressed on the costas and lateral veins. For this reason, it would be better to regard the Formosan species as a variety of *Q. spinosa*.

Quercus tarokoensis HAYATA sp. nov. (Pl. XI.). Arbor. Rami pallidocinerascentes vel purpurascetes minute lenticellati, ramulis gracilibus fulvostellato-tomentosis foliatis. Folia variabilissima coriacea vel chartacea subdecidua elliptica ovata vel oblonga 3-4 cm. longa $2-2\frac{1}{2}$ cm. lata apice obtusa acuta vel acutissima basi leviter cordata margine aristato-serrulata, serrulis erecto-ascendentibus apice aristis instructis, aristis ascendentibus 1 mm. longis interiore recurvis, pagine utraque glabra ad costas sparce stellato-hirsuta, venis primariis lateralibus utroque latere costae 7-8 mediis 50° infimis 90° a costa egressis rectis apice ad serras attingentibus, petiolis 3 mm. longis stellato-tomentosis, stipulis caducissimis lineari-spathulatis 7 mm. longis $1\frac{1}{2}$ mm. latis apice obtusis basi attenuatis. Amentum floris ♂ gracile pendulum 3 cm. longum stellato-hirsutum a supra basin remote floratum. Perianthium late obconicum 2-3-lobatum extus hirsutum intus glabrum $1\frac{1}{2}$ mm. longum. Stamina 4-5, filamentis $2\frac{1}{2}$ mm. longis glabris, antheris linearibus 1 mm. longis $\frac{1}{4}$ mm. latis. Cupula disciformis 12 mm. in diametro 3 mm. alta extus squamis multi-seriatim instructa, squamis triangularibus $\frac{1}{2}$ mm. longis $\frac{2}{3}$ mm. latis apice obtusis imbricatis adnatis adpresse hirsutis, intus adpresse sericeo-hirsuta ad centrum cicatricibus glandis notata, cicatricibus 5

mm. in diametro. Glans glabra ovoideo-globosa $1\frac{1}{2}$ cm. longa 13 mm. lata apice stigmatē apiculata basi rotundata, cicatricibus 5 mm. in diametro.

HAB. Batakan, leg. S. SASAKI et B. HAYATA. Comparable to some extent to *Quercus spinosa* DAVID, but differs from it by the acuter, smaller, thinner and less wrinkled leaves.

Coniferæ.

Juniperus LINN.

Juniperus formosana HAYATA Fl. Mont. Formosa p. 209 var. **concolor**

HAYATA n. v. (Fig. 25). Frutex erectus, ramis ascendentibus vel pendulis rubro-purpurascens rugosissimis, ramulis gracilibus toto foliatis trigonis ad angulos canalibus resiniferis teretibus instructis facie glabris ad nodos trifoliatis, internodiis 2 mm. longis. Folia linearia 17 mm. longa 2 mm. lata apice acuminata aristata basi haud contracta basi intus callis pulviniformibus singulis instructa ad nodos ramulorum ternatim verticillata ascendentia vel patentia, extus costis elevatis convexis intus leviter concavis, partibus stomatiferis utroque latere costæ $\frac{2}{3}$ mm. latis, partibus non-stomatiferis $\frac{1}{3}$ mm. latis. Fructus subsessilis globosus 9 mm. in diametro apice Λ -forme striatus. Semina 3 oblique ovata subtrigona 6 mm. longa 3 mm. lata apice obtusa retusa ad centrum summorum breve apiculata basi rotundata facie 1- vel 2-faveolata, testa ossea.

HAB. Busegan-Seisui, leg. B. HAYATA et S. SASAKI, Mai. 1917.

Differs from the type by the leaves which are not glaucous beneath, and which have broader stomatiferous bands on the under side.

Podocarpus L' HER.

Podocarpus nankoensis HAYATA sp. nov. Arbor, rami et ramuli ascendentes vel patentes interdum plus minus penduli graciles, cortice cineras-

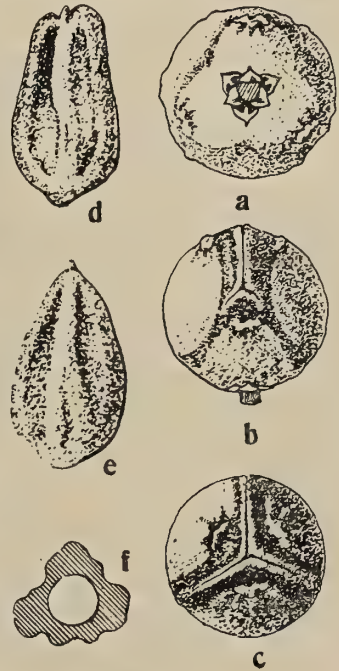


Fig. 25, *Juniperus formosana* HAY. var. *concolor* HAY.
a, a fruit; b, the same, seen from side; c, the same, seen from above; d, e, a seed, seen from different sides; f, the same, in section.

cente longitudinaliter rugoso fissio glabro. Folia opposita lanceolata ovato-lanceolata apice obtusa 6-9 cm. longa 13-25 mm. lata basi cuneato-attenuata sessilia margine integerrima utraque glabra crasso-coriacea haud costata subtus pallidiora multinervia. Fl. ♂ breve racemosi, racemis axillaribus 1 cm. longis sessilibus 4-5-floratis basi bracteis 2-3 instructis, bracteis $2\frac{1}{2}$ -3 mm. longis triangularibus 1 mm. latis apice longe cuspidatis margine serrulatis glabris, cuspidibus validibus 1-2 mm. longis. Flores cylindrici sessiles 5-7 mm. longi glabri, staminibus 70-100 spiraliter approximatis dispositis. Stamina sessilia 2-locularia adnata, antheris oblongis 1 mm. longis introrse dehiscentibus, connectivis apice productis, partibus productis cuspidiformibus 1 mm. longis triangularibus apice acutis.

HAB. Nankō, leg. B. HAYATA, Mai. 1916.

Near *Podocarpus Nageia*, but differs from it in the much smaller male flowers with much narrower scales. Branches of this new species are somewhat drooping, while those of *P. Nageia* are spreading and ascending.

Orchideæ.

Dendrobium SEV.

Dendrobium erythroglossum HAYATA (Pl. XII.) Ic. Pl. Formos. IV. p. 36.

Liparis RICH.

Liparis keitaoensis HAYATA sp. nov. (Pl. XIII). Terrestis, radicibus gracilibus haud incrassatis e basi pseudobulbi oriundis. Pseudobulbi annotini ovoidei plus minus complanati 4 cm. longi $2-2\frac{1}{2}$ cm. lati apice obtuso-acuti basi rotundati haud squamati subnudi. Caulis erectus gracilis basi haud incrassatus glaber in specimine nostro cum racemo 22 cm. longus e basi pseudobulbi annotini oriundus 1-folius basi squamis vaginiformibus 2-3 et basi folii involutus. Folia e basi caulis oriunda petiolata, laminis cordatis 11 cm. longis 9 cm. latis apice acutis basi profunde cordatis caulem amplexantibus supra pallido-viridibus subtus pallidissimis utraque glabris margine integerrimis planis haud crispulatis crassiusculis supra subnitidis, nervis lateralibus utroque latere costæ 5-6, venulis inter nervos circ. 5 tessellato-reticulatis haud visis; laminis horizontaliter patentissimis, petiolis erectis 6 cm. longis secus longitudinem plicatis toto amplexicaulibus latere complanatis latere 1 cm. latis

glabris pallidis basi squamis 1-2 involutis, squamis vaginiformibus 3-5 cm. longis petiolum perfecte amplectantibus. Racemi glabri erecti subrecti subnudi angulato-teretes ad angulos angustissime alati laxiuscule floriferi, bracteis basi pedicelli singulis minutis latissime triangularibus 1 mm. longis 2 mm. latis apice acutis, pedicellis cum ovariis circ. 1 cm. longis angulatis pallido-
viridibus transverse divaricatis. Flores virides. Sepalum posticum lineare integrum margine reflexo-convoluto-recurvum 1 cm. longum basi 2 mm. latum apice obtusum basi plus minus cordatum dorso prominente carinatum glabrum; sepala lateralialia plus minus obliqua quam posticum latiora. Petala angustissime linearia 1 cm. longa minus quam 1 mm. lata apice truncata margine plus minus convoluta. Labellum obovato-obtriangulare 8 mm. longum totiusque latum apice truncatum ad centrum apicis minute cuspidatum, cuspidate triangulari 1 mm. longa totiusque lata, margine denticulatum apice plus crispulatum trinervium, nervis lateralibus extrorse venulis 3-4 gerentibus, medio stria singula nitida viridissima instructum basi callis duobus instructum facie utraque læve. Columna cum operculo 4 mm. longa anteriore recurva glabra semiteres basi valde dilatata utroque latere basis auriculata, auriculis decedentibus obtusis $\frac{1}{3}$ mm. longis, apice utroque latere anteriore alata, alis triangularibus. Anthera 2-locularis, pollinia 2.

HAB. Keitao, leg. B. HAYATA, Aprili. 1916.

Very near *Liparis cordifolia* HOOK. f. (KING and PANTLING Orchids of the Sikkim-Himalaya t. 28); but distinguishable from it in the lips which are, in this new species, nearly smooth and glabrous on the upper surface, slightly denticulate at the margin and dark green on the middle striation on the upper surface. In *Liparis cordifolia*, the lips are tuberculate on the upper surface, conspicuously denticulate at the margin and bright yellow on the middle striation.

Liliaceæ.

Trillium LINN.

Trillium Morii HAYATA sp. nov. (Pl. XIV.) = *Trillium Tschonoskii* HAYATA (non MAXIM.) Ic. Pl. Formos. V. p. 233. Caulis 40-50 cm. altus teres glaber inferiore 7 mm. in diametro haud ramosus simplex erectus rectus apice foliis verticillatis 3 instructus, e basi radices filiformes emittens. Folia

sessilia late rhomboideo-rotundata latiora quam longa 10 cm. longa totiusque lata apice subito cuspidato-acuta basi late cuneata vel rotundata utraque pagine glabra margine integra membranacea 3-nervia. Flores ad apicem caulis terminales 2-2½ cm. in diametro solitarii glabri pedunculati, pedunculis erectis rectis teretibus 2-3 cm. longis. Sepala 3 ovato-lanceolata 17 mm. longa 8 mm. lata apice acuminata ad summum obtusa glabra margine integra. Petala 3 ovato-oblonga 2 cm. longa 9 mm. lata margine integra apice obtusa basi plus minus contracta membranacea. Stamina 6 glabra, filamentis 5 mm. longis complanatis basi dilatatis 1 mm. latis medio ½ mm. latis, antheris adnatis linearibus 3½ mm. longis apice apiculatis. Ovarium late ovoideum 9 mm. longum 8 mm. latum apice obtusum ad stigmata trifida abeuns, ramis stigmatis 3 mm. longis exteriori recurvis intus dense botryoideo-hirsutis, 3-loculare.

HAB. Tonkurankei, leg. U. MORI, Aprili. 1910.

Closely related to *T. Tschonoskii* MAXIM., but differs from it in the densely hirsute stigmata.

Allium LINN.

Allium morrisonense HAYATA sp. nov. Bulbus tunicatus ovoideo-(ampulli)-formis 15 mm. longus apice attenuatus. Folia tenuissima 30-40 cm. longa 1½ mm. lata fere filiformia glabra apice acuminata. Scapus erectus glaber rectus 45-35 cm. longus teres medio 2 mm. latus apice umbellam singulam gerens. Umbella simplex terminalis solitaria basi 2-bracteata, bracteis hyalinis ovatis apice acuminatis, radiis (pedicellis) circ. 6 gracilibus 2 cm. longis patentibus. Segmenta perianthii exteriora rotundato-oblonga 5 mm. longa 4 mm. lata apice rotunda basi contracta obtusa margine integra intus valde concava; interiora oblonga 6 mm. longa 4 mm. lata apice obtusa basi late cuneata ad basin 1 mm. lata margine plus minus eroso-crenulata vel subintegra 1-nervia. Stamina 6, 8-10 mm. longa, filamentis glabris complanatis, antheris oblongo-ovoideis 2 mm. longis 1 mm. latis apice attenuatis basi cordatis. Ovarium depresso-globosum 2 mm. longum 3 mm. latum apice depressum basi stipitem 1 mm. longum abeuns.

HAB. Mt. Morrison, ad 5000 ped. alt., leg. U. MORI.

Near *Allium Bakeri*, but differs from it in having much slenderer and

longer leaves.

There is a specimen labelled as *A. Bakeri* in the herbarium at Kew, which is exactly like the present species.

Gramineæ.

Conspectus of the Formosan Genera.

Mainly arranged after HOOKER's system given in "Fl. Brit. Ind. VII."

Series A. Panicaceæ. Spikelets articulate on their pedicels, or deciduous with them, 1-2-fld., upper fl. alone (if 2) fruiting.

Exceptions Spikelets inarticulate on their pedicels in *Arundinella* and *Isachne*. Spikelets articulate on their pedicels, or with articulate pedicels occur in Poaceæ, in *Alopecurus*, *Polypogon* and *Lophatherum*. Upper flower alone fertile in TRIBE PHARAIDEÆ of Poaceæ, and in *Tristachya*.

I. Rachis of infl. inarticulate. Fl. gl. usually coriaceous or herbaceous.

TRIBE I. PANICEÆ. Spikelets 1-2-fld., if 2, upper fl. bisexual, lower male or neuter, rarely both fertile (*Spinifex* is dioecious).

* Spikelets articulate on their pedicels, except *Isachne* and *Arundinella*.

† Spikelets not involuclate by bristles.

§ Spikelets not awned (gl. II. and III. beaked or awned in *Pan. Crus-Galli*). (See also *Arundinella*).

Spikelets 1-fld. dorsally flattened, base not thickened; gls. 3.

1. *Paspalum*.

Spikelets of *Paspalum* 1-fld., but with a thickened basal callus, panicle.

2. *Eriochloa*.

Spikelets 2-fld. subglobose, panicle; outer empty glumes 2 nearly equal; both the flg. gls. as well as the paleæ, of a firmer texture, all awnless.

3. *Isachne*.

Spikelets of *Isachne*; but 1-fld., gls. 4, outer glumes very deciduous; flg. gl. membranaceous.

4. *Sphaerocaryum*.

Spikelets 1-fl. panicled or spicate, gls. 4: I and II very rarely subequal, II and III awned in *P. Crus-Galli*, IV rarely very shortly awned.

5. *Panicum*.

Spikelets dorsally flattened, on one side of slender spikes, gls. 4, or the first entirely reduced; others like *Panicum*

6. *Digitaria*.

Spikelets of *Panicum*, but gl. IV narrowed into a short, flattened stipe.

7. *Ichmanthes*.

Spikelets innumerable, very minute, densely crowded in the capillary branches of a very large panicle; gl. IV setaceously hairy on the marginal costae.

8. *Thysanolaena*.

Spikelets panicled, branches of panicle produced beyond the uppermost spikelets; gl. I minute, hyaline.

9. *Chamæraphis*.

Diœcious, male spikelets in clustered spikes, fem. solitary; a stout grass, leaves setiformed.

10. *Spinifex*.

§§ Spikelets awned, except in some sp. of *Arundinella*.

Spikelets solitary or fascicled on a simple rachis or the branches of a panicle; gl. I long awned.

11. *Oplismenus*.

Spikelets of *Panicum*, but marginal nerves of gl. II barbate, and palea of III deeply cleft, IV awned.....

12. *Axonopus*.

Spikelets persistent on the pedicels, or gls. I and II separately deciduous, IV deciduous; usually awned, awn bent.

13. *Arundinella*.

†† Spikelets each surrounded by an involucl of bristles.

14. *Setaria*.

** Spikelets persistent on their pedicels, at least the fertile, or deciduous with their pedicels.

† Spikelets in involuclled deciduous fascicles.

15. *Pennisetum*.

†† Spikelets not involuclled.

16. *Thuarea*.

TRIBE II. ORYZÆ. Spikelets 1-fl., articulate on their pedicels and deciduous from them. Palea 1-3 nerved, stamens 6.

Spikelets 2-sexual, awned or not; gl. 4, I and II minute or setaceous.

17. *Oryza*.

Spikelets 2-sexual, awnless; gls. 2, broad, thin.

18. *Leersia*.

Spikelets 1-fl., unisexual narrow. Panicles long abundantly floriferous androgynous; gls. 2, Stamens 6.

19. *Zizania*.

TRIBE III. ZOYSIÆ. Spikelets 1-fl., deciduous with their pedicels, 2-sexual, or some imperfect.

Spike very slender; spikelets narrow, gl. I and II awned.

20. *Perotis*.

Spike rigid; spikelets appressed to the rachis, not awned.

21. *Zoysia*.

II. Rachis of inflorescence usually articulate (except *Apluda*).

TRIBE IV. ANDROPOGONÆ. Spikelets usually 2-nate, or the terminal in the infl. 3-nate, pairs homo- or heterogamous. Fl. gl. smaller than the empty, hyaline, often awned or reduced to an awn.

Subtribe I. *Maydeæ*. Spikelets spicate, all 1-sexual; male spikes in terminal panicles, or continuous with fem. spike.

Fruiting spikelets enclosed in a stony, nut-like polished bract.

22. *Coix*.

Fruiting spikelets enclosed in leafy bracts.

Female spikelets densely crowded on a cylindric

spongy rachis, grain exposed. 23. *Zea*.

Female spikelets sunk in alternate cucullate dilatation of the rachis of the spike, which is hidden in the leaf-sheath; grain not exposed.

24. *Euchlœna*.

Subtribe II. *Dimeriææ*. Spikelets homogamous, secund on a slender inarticulate rachis, 1-fl., diandrous.

25. *Dimeria*.

Subtribe III. *Sacchareææ*. Spikelets homogamous, in compound racemes or panicles (except *Pollinia*); gl. I. not sunk in a hollow of the rhachis.

* Rhachis not or rarely fragile.

Spikelets in a cylindrical silvery thyrsus, 1-fl., not awned. 26. *Imperata*.

Spikelets paniced, 2-nate, 1-fl., awned.

27. *Miscanthus*.

** Rhachis fragile.

Spikelets in paniced racemes, 2-fl., awned.

28. *Spodiopogon*.

Spikelets in geminate digitate or fascicled spikes.

Spikelets binate, one sessile, the other pedicelled. 29. *Pollinia*.

Spikelets binate, both pedicelled.

30. *Polliniopsis*.

Spikelets in a thyrsus of spiciform racemes, 1-fl., awnless. 31. *Saccharum*.

Spikelets in a thyrsus of spiciform racemes, 1-fl., awned. 32. *Erianthus*.

Subtribe IV. *Ischæmææ*. Spikelets many, in solitary digitate or fascicled spikes, usually heteromorphous; gl. I not sunk in a hollow of the rachis (see *Pollinia* in *Sacchareææ*).

* Margins of gl. I of sessile spikelets inflexed.

Spikes rarely solitary; spikelets 2-nate, 2-fl.,
awned. 33. *Ischaemum*.

Spikes solitary, spikelets 1-fl., gl. I pectinate.

34. *Eremochloa*.

** Margins of gl. I of sessile spikelets not inflexed.

Spikes solitary; spikelets 2-nate, 1-2-fl., 2-awned.

35. *Pogonatherum*.

Spikes digitate; spikelets 1-fl.,

36. *Arthraxon*.

Subtribe V. Apludeæ. Spikelets 3 on an inarticulate
rachis. 37. *Apluda*.

Subtribe VI. Rottboellieæ. Spikelets homo- or hetero-gamous,
1-2-fl., solitary, or 2- rarely 3-nate on the internodes
of an articulate spike or raceme, not awned., gl. I
not keeled, adnate to or sunk in a depression formed
by the internode and pedicel of the upper spikelets;
gl. of sessile spikelet 4.

Spikelets 2-nate, gl. I flat. 38. *Rottboellia*.

Spikelets 2-nate, gl. I globose. 39. *Manisuris*.

Spikelets solitary, gl. I convex. 40. *Ophiurus*.

Subtribe VII. Euandropogoneæ. Spikelets heterogamous
1-fl., 2- rarely 3-nate on the whorled articulate
branches of simple or compound racemes or panicles,
gl. 4, I not keeled, IV usually awned.

Sessile spikelets of all the pairs alike in sex and
form throughout the spikes.

Joints of rhachis and pedicels of upper spikelets
linear, compressed, with usually a central trans-
lucent channel and thickened margins.

41. *Andropogon*.

Joints of rachis very few, filiform, opaque;
lodiceles ciliate; grain dorsally compressed.

42. *Sorghum*.

Joints of rachis few ; spikelets articulate on the obliquely truncate, bearded tips of the branches of the panicle.

Spikelets in threes, 1 sessile between 2-pedicellate. 43. *Chrysopogon*.

Lowest one or more sessile spikelets differing from all those above it in sex or form.

Spikes binate on the peduncle which is enclosed in a spathiform sheath ; sessile spikelet dorsally compressed. 44. *Cymbopogon*.

Spikes solitary, lower pairs of spikelets very unlike the upper ; upper sessile spikelets cylindric ; all spikelets monoecious.

45. *Heteropogon*.

Spikelets in 2 superposed series ; upper series of hetero gamous pairs, and a terminal male, lower a whorl of 4-persistent males or neuters. 46. *Themeda*.

Series B. Poageæ. Spikelets continuous (not articulate with) their pedicels, 1-many-fl'd., rachilla articulate at the base, and often between the flg. gls.; lowest fl. always fruiting, upper often male or neuter. (Exceptions. Articulate on their pedicels in *Polypogon*. Upper fl. alone bisexual in *Phalarideæ*. Spikelets articulate on their pedicels, or gl. I and II separately deciduous occur in *Alopecurus*, *Melica* : see under *Panicææ* some genera with spikelets inarticulate at the base).

TRIBE V. AGROSTIDÆÆ. Spikelets 1-fl'd.; rachilla jointed at the base, produced or not beyond the flg. gl.; gls. 3, I and II empty, III flg. awned. Exceptions: Spikelets sometimes 2-fl'd. in *Sporobolus* and *Muehlenbergia*.

Subtribe I. *Phleoideæ*. Spikelets in spiciform or subspiciform panicles, gl. III. hyaline, loosely wrapping the grain ; stigmas exerted from the top of the spikelet.

47. *Alopecurus*.

Subtribe II. *Euagrostecæ*. Spikelets 1-flid. usually small, in open or contracted many-flid. panicles; gls. usually thin or membranous; stigmas laterally exserted from the spikelet. (Spikelets rarely 2-flid. in *Sporobolus* and *Muehlenbergia*).

Spikelets articulate on their pedicels, or gl. I and II separately deciduous, or pedicel articulate in the middle. 48. *Polypogon*.

Spikelets and pedicels inarticulate, gl. I and II persistent.

Gls. all awnless; I and II 1-nerved, pericarp of grain loose. 49. *Sporobolus*.

Gls. I and II subequal, 1-nerved, awnless, awn of III dorsal or O. 50. *Agrostis*.

Gls. I and II unequal, awnless, 1-nerved, awn of III terminal. 51. *Muehlenbergia*.

Gls. I and II 3-nerved, awnless, base of III penicillate with long hairs.

52. *Calamagrostis*.

TRIBE VI. AVENEÆ. Spikelets 2- or more flid., paniced, very rarely spicate, or panicle subspiciform; fl. gls. usually awned, awn geniculate and often twisted, rarely straight or O; rachilla produced or not beyond the upper fl. gl.

Subtribe I. *Aireæ*. Spikelets 2-flid.; gls. membranous; rhachilla not produced. 53. *Aira*.

Subtribe II. *Euavenæ*. Spikelets 2- or more flid., rhachilla produced.

Spikelets 2-flid., both bisexual, awned.

54. *Deschampsia*.

Spikelets 2-6-flid.; fl. gl. awned, awn subterminal or dorsal

Annual. Spikelets pendulous; gl. I and II 5-7-

nerved, ovary with a villous top. 55. *Avena*.

Perennials. Spikelets erect. Fl. gls. 3-5-nerved,
ovary quite glabrous. 56. *Trisetum*.

TRIBE VII. CHLORIDEÆ. Spikelets 1- or more fld., 2-seriate
(sometimes very distantly) and secund on an
inarticulate or on the spiciform branches of a
slender panicle; fl. all or the lower only bisexual;
rhachilla produced or not beyond the upper fl. gl.

* Spike solitary, terminal.

Spikelets 1-2-fld., in sessile inarticulate clusters,
awned. 57. *Enteropogon*.

Spikelets many-fld., fl. gl. 3-awned.

58. *Tripogon*.

** Spikes or spiciform, branches digitate, racemed or
panicled.

Spikes digitate, 1-fld., upper imperfect fl. O.

59. *Cynodon*.

Spikes solitary, spicate or racemed; spikelets 2-
or more fld., upper fl. imperfect. 60. *Chloris*.

Spikes digitate or whorled; spikelets 3-6-fld.,
densely crowded, awnless.

Spikelets densely imbricate, pointing fore-
wards, gl. II acute. 61. *Eleusine*.

Spikelets erect, at right angles to the rhachis
of the spike. Glume II short, suborbicular,
abruptly shortly awned.

62. *Dactyloctenium*.

Spikes panicled filiform; spikelets very minute,
alternate, 1 or more fld., awnless.

63. *Leptochloa*.

TRIBE VIII. FESTUCACEÆ. Spikelets 2- or more-fld., pedicelled,
rarely sessile, in effuse or contracted rarely spiciform,
panicles; rhachilla articulate at the base and often

at the base of fl. gls., always produced beyond the uppermost fl. gl.

Subtribe I. Arundineæ. Spikelets panicled, 2-many-fl.; gls. very narrow, flg. penicillate with long silky hairs on the callus or sides or both, lowest fl. gl. sometimes male or neuter.

Rachilla elongate, glabrous; fl. gl. silkily hairy.

64. *Arundo*.

Rachilla very short; fl. gls. glabrous, callus with long silky hairs.

65. *Phragmites*.

Subtribe II. Eragrostæ. Infl. various. Spikelets 2-many-fl.; fl. gls. 1-3-nerved, entire, 3-toothed, 3-lobed or 3-awned.

Infl. various; spikelets many-fl.; empty gls. shorter than the lowest flg. gl., 1-nerved; flg. gls. 3-nerved; grain very minute terete.

66. *Eragrostis*.

Spikelets sessile on the spiciform branches of a tall, broad panicle, many fl.; fl. gls. 3-4-toothed.

67. *Diplachne*.

Subtribe III. Centotheceæ. Spikelets 1-many-fl., 1-2-seriate on the rachis of a simple spike or on the long slender branches of a simple panicle—Leaves broad, tessellately nerved.

Spikelets 1-fl., secund and articulate at the base; upper gls. empty convolute with setiform tips.

68. *Lophatherum*.

Spikelets 3- or more fl., secund, persistent; fruiting gls. with reflexed submarginal bristles, (but bristles are entirely absent in the Formosan var. *inermis*).

69. *Centotheca*.

Subtribe IV. Eufestuceæ. Spikelets usually panicled, 2

or more-flid.; fl. gls. 5- many- (very rarely 3-) -nerved, upper empty or O; styles short (spikelets of *Brachypodium* in long very lax spikes).

Spikelets laxly paniced, few-flid; gls. keeled, 5-nerved, awnless, nerves rarely meeting at the tip.

70. *Poa*.

Spikelets paniced, many-flid., fl. gls. acute or awned, dorsally rounded, top of ovary naked or hairy.

71. *Festuca*.

Spikelets spicate, many-flid., mucronate or awned.

72. *Brachypodium*.

TRIBE IX. HORDEÆ. Spikelets 1 or more-flid.; sessile, 1-2 or more seriate on the rachis of a simple spike, or partially sunk in cavities of the same; rachilla usually articulate and produced beyond the flg. gls. into a naked glumiferous bristles; gls. awned or not, I and II opposite or subcollateral, persistent or separately deciduous, I sometimes absent or very minute.

Subtribe I. *Lolieæ*. Spikelets solitary at the nodes of the spike; plane of the spikelets radial to the rachis.

Spikelets 1-2-flid., gl. I minute or O, II (or one opposite fl. glume, or in Formosan species outermost one) much longer than the hyaline III; spike cylindric, rachilla glabrous. 73. *Lepturus*.

Subtribe II. *Triticeæ*. Spikelets solitary at the nodes of the spike; plane of spikelets tangential to the rachis; fl. gls. 5-9-nerved, lateral nerves not conniving, short or ending in teeth or awns. 74. *Triticum*.

TRIBE X. BAMBUSEÆ. Shrubby or arboreous grasses. Leaves flat, jointed on the sheath. Spikelets 1-∞-flid.; lower 2- or more gls. empty, gradually increasing in size up to the flowering, with sometimes small terminal imperfect ones. Palea usually large, 2-keeled. Lodi-

celes usually 3. Stamens 3, 6, or ∞ . Styles 2-3.

Subtribe I. Arundinarieæ. Palea 2-keeled; stamens usually 3; pericarp thin, adnate to the seed.

Spikelets 1-many-fl.; racemed or panicled; empty gls. 1-2. 75. *Arundinaria*.

Spikelets 1-4-fl., spicate; spathes bracteate; empty gls. 2-3. 76. *Phyllostachys*.

Subtribe II. Eubambuseæ. Palea usually 2-keeled; stamens 6; pericarp thin, adnate to the seed.

77. *Bambusa*.

Subtribe III. Dendrocalameæ. Palea 2-keeled; stamens 6; pericarp fleshy or crustaceous; seed free.

78. *Dendrocalamus*.

Subtribe IV. Melocanneæ. Spikelets 1-fl. Palea 0 or glume-like. Stamens 6- ∞ . Pericarp crustaceous or fleshy, seed free. 79. *Schizostachyum*.

I. *Paspalum* LINN.

Conspectus of the species.

Spikelets rounded obtuse nearly orbicular.

First and second glumes membranaceous..... 1. *P. scrobiculatum*.

First glume membranaceous, but second glume coriaceous.....
..... 2. *P. akoensis*.

Spikelets oblong acute at the apex.

First and second glumes 5-nerved. 3. *P. distichum*.

First glume 4-nerved, second glume 5-nerved.....
..... 4. *P. distichum* var. *anpinense*.

1. ***Paspalum scrobiculatum* LINN., MATSUM. et HAYATA Enum. Pl. Formos. p. 497.**

2. ***Paspalum akoensis* HAYATA sp. nov. (Fig. 26).** Caulis 80 cm. longus erectus glaber. Folia radicalia minora cum vaginis 9 cm. longa, caulina longiora cum vaginis 30 cm. longa, vaginis 10 cm. longis glabris, ligulis 1 mm. longis membranaceis truncatis glabris $3\frac{1}{2}$ mm. latis, laminis linearibus 20 cm. longis 5-6 cm. latis apice acuminatis basi ad 3 mm. con-

tractis utraque pagine glabris et lævibus margine glabris lævibus. Spicæ 2-6 versus apicem caulis subsecunde paniculatim dispositæ a se 5-10 mm. remotæ lineares 5-7 cm. longæ 3 mm. latæ sessiles rectæ ascendentes vel patentes; rhachis spicæ complanata alata cum ala 5-7 cm. longa 2 mm. lata glabra, costa utraque pagine elevata. Spiculæ ad paginam inferiorem rhachis secunde utroque latere costæ 1-seriatim dispositæ contiguæ, pedicellis spiculæ e costa oriundis 1-1½ mm. longis alatis cum alis ½ mm. latis plus minus pubescentibus apice incrassatis cum spicula articulatis. Spiculæ globosæ 2 mm. longæ minus quam 2 mm. latæ apice obtusæ plus minus complanatæ; glumæ 3, extima globosa 2 mm. longa valde concava membranacea tenuiter 5-nervia

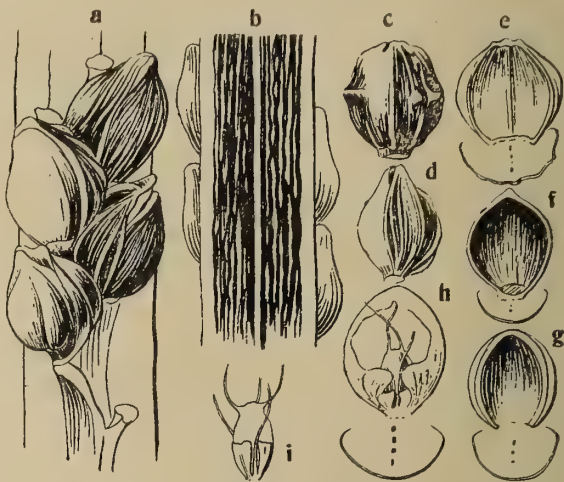


Fig. 26, *Paspalum akoense* HAYATA; a, a portion of a spike; b, the same, seen from back; c, a spikelet; d, the same, seen from side; e, gl. I.; f, gl. II.; g, gl. IV.; h, palea; i, pistil with lodicules.

apice rotundata basi contracta; glumæ interiores globosæ valde concavæ 2 mm. longæ margine tenuiter incurvæ induratæ nitidæ; palea oblonga 1½ mm. longa 1⅓ mm. lata apice obtusa basi contracta valde concava margine interiore incurva basi utroque latere auriculis triangularibus incurvis instructa.

HAB. Akō, leg. T. SOMA, Aug. 1914.

Differs from *P. scrobiculatum* by the coriaceous shining second and smooth (not pitted) third, glumes. In *P. scrobiculatum* both first and second glumes are membranaceous and the third glume is sometimes pitted on the margin.

3. ***Paspalum distichum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 497.

4. ***Paspalum distichum*** L. var. ***anpinense*** HAYATA v. n. (Fig. 27) Spiculæ ovato-oblongæ complanatæ glabræ 3½ mm. longæ 1½ mm. latæ apice

acutæ; gluma I. tenuissima medio enervia prope marginem utroque latere 2-nervia margine interiore plicata glabra; gl. II. 5-nervia cum gl. I. conformis; gluma III. cum palea conformis oblonga $2\frac{1}{2}$ mm. longa apice acuta indurata nitida.

HAB. Anpin, Sept. 1913, leg. T. SÔMA.

Differs from the type in having the 4-nerved first and 5-nerved second glumes. In the type, they are all 5-nerved.

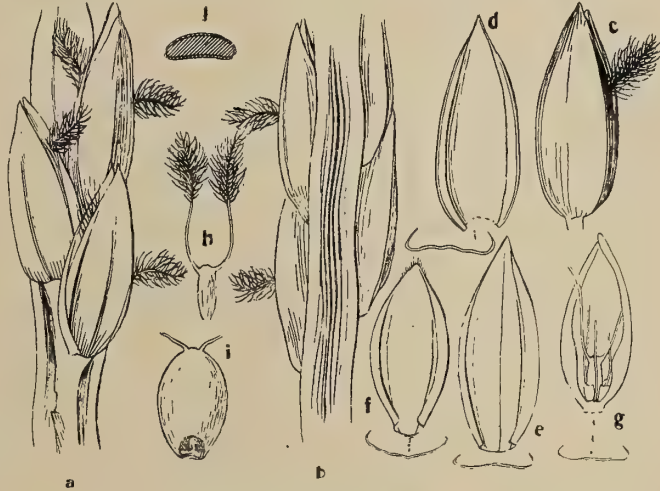


Fig. 27, *Paspalum distichum* LINN. var. *apinense* HAYATA; a, a portion of a spike; b, the same, seen from back; c, a spikelet; d, gl. I.; e, gl. II.; f, gl. III.; g, a palea; h, a pistil; i, a caryopsis; j, section of the same.

II. *Eriochloa* H. B. et K.

Spikelets thinly hirsute, smaller..... 1. *E. polystachya*.

Spikelets densely villose, larger 2. *E. villosa*.

1. ***Eriochloa polystachya*** B. H. et K.; MATSUM. et HAYATA Enum. Pl. Formos. p. 498.

2. ***Eriochloa villosa*** KUNTH.; MATSUM. et HAYATA Enum. Pl. Formos. p. 498.

III. *Isachne* R. BR.

1. Flowers in a spikelet are nearly alike, both hirsute or both glabrous 2

Flowers in a spikelet are unlike; one is glabrous, the other hirsute 1. *I. heterantha*.

2. Panicles spreading 10 cm. long, branches spreading.... 2. *I. arisanensis*.
Panicles contracted..... 3

3. Stem erect, leaves rigid scabrous, but not hirsute, outer and flowering glumes glabrous 3. *E. australis*.

Stem shorter prostrate at the base, but ascending under panicles;

leaves soft, hirsute..... 4

4. Flowers nearly glabrous..... 4. *I. formula*.

Flowers densely hirsute 5. *I. debilis*.

1. ***Isachne heterantha*** HAYATA sp. nov. (Fig. 28). Caulis basi procumbens apice ascendens basi ad nodos radicans, internodiis 2-3 cm. longis, multi-sulcatus multi-striatus teres ad nodos barbatus 30-40 cm. longus. Folia longe vaginata, lamina oblonga $2\frac{1}{2}$ -2 cm. longa 8-10 mm. lata apice

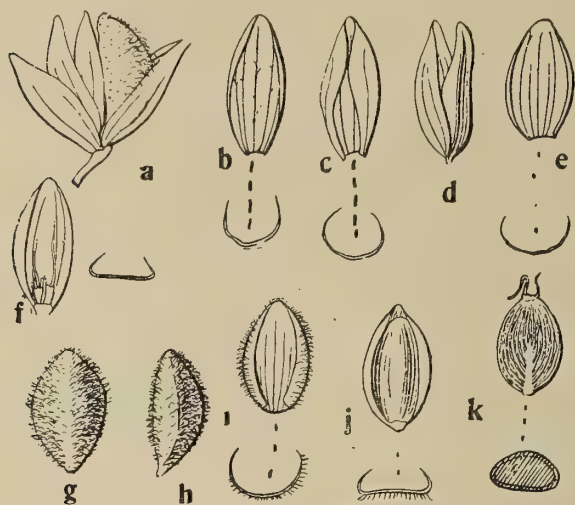


Fig. 28, *Isachne heterantha* HAYATA; a, a spikelet; b, glume I.; c, glume II.; d, gl. III. with its palea; e, glume III.; f, palea of gl. III.; g, glume IV.; h, the same, seen from side; i, glume IV.; j, Palea of the glume IV.; k, caryopsis.

acuminata basi cordato-rotundata amplexicauli utraque scabra hirsuta margine integra nervo-marginata ad marginem scabra basi margine longe ciliata, vagina 1-2 cm. longa tubiformi barbata, ligula ad barbas numerosas reducta. Panícula terminalis 4 cm. longa 3 cm. lata, ramis ramulis rectis patentibus plus minus crispatis subglabris, pedicellis 1-3 mm. longis. Spiculæ oblique

globosæ ad apicem pedicellorum supra glumas inferiores articulatim insitæ; gl. I. et II. æquiformes oblongæ $1\frac{1}{3}$ mm. longæ membranaceæ 5-7-nerviæ; gl. III. tenuissime membranacea oblonga $1\frac{1}{4}$ mm. longa apice obtusa glabra paleam conformem ferens; glama IV. crustacea oblonga 1 mm. longa obtusa hirsuta valde convexa, palea dorso hirsuta plana margine interiore incurva obtusa oblonga 1 mm. longa.

HAB. Taihoku, Mentenzan, leg. Y. SHIMADA, Oct. 1913, (typus No. 1) Taihoku, Oct. 1906, leg. G. NAKAHARA.

Rather small form, resembling *Isachne myosotis*; but in this new

species, the outer glumes are quite glabrous, and the flowering glume and palea of the sessile lower sterile flower are membranous and quite glabrous, while those of the stalked upper fertile flower are coriaceous and densely hirsute.

2. **Isachne arisanensis** HAYATA sp. nov. (Fig. 29). Rhizoma ignotum. Caulis 60 cm. longus gracillimus simplex haud ramosus glaber basi procumbens ad nodos radicans, internodiis 5-6 cm. longis. Folia tota caulina patentissima recta, vaginis 3-3½ cm. longis latere uno fissis margine ciliatis, ligulis e pilis rectis 2 mm. longis constitutis, laminis lanceolato-linearibus 5-10 cm. longis 5-7 mm. latis apice acuminatis basi plus minus contractis ad 2 mm. contractis margine scaberulis utraque pagine glabris. Panicula laxa pyramidalis 9 cm. longa

totiusque lata apice acuta, ramis et ramulis gracillimis glabris plus minus crispatis laxe speculiferis, pedicellis 5-10 mm. longis glabris supra glumas inferiores articulatis. Spiculæ late obconicæ 1½ mm.

longæ 1½ mm. latæ 2-floriferae; glumæ I. et II. inferiores vacuæ oblongæ subæquales 1½ mm. longæ 3-5-nerviæ glabræ; gl. III. et IV. floriferae subæquales 1½ mm. longæ valde concavæ cum palea indurata apice acutæ; Paleæ oblongæ 1 mm. longæ dorso planæ margine interiore plicatæ glabræ.

HAB. Arisan: Mingetsu, locis umbrosis 7000 ped. alt., April. 1916. leg. B. HAYATA.

Near *I. australis* R. Br., but differs from it by the much taller and slenderer form with very much spreading panicles and smaller spikelets. The leaves are much larger measuring 10 to 15 cm. in length.

3. **Isachne australis** R. Br.; MATSUM. et HAYATA Enum. Pl. Formos. p. 499.

Isachne Clarkei HAYATA Fl. Mont. Formos. p. 234, (non Hook. f.).

4. **Isachne firmula** BÜSE; HEMSLEY Ind. Fl. Sin. III. p. 322.

Isachne myosotis NEES. var. *nudiglumis* HACK.; MATSUM. et HAYATA

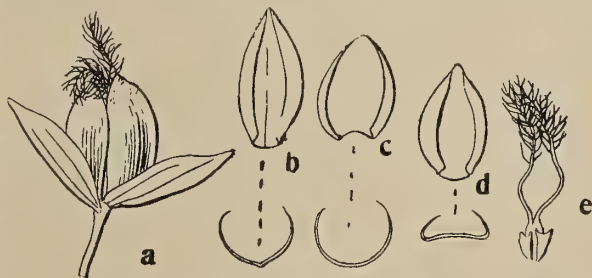


Fig. 29, *Isachne arisanensis* HAYATA; a, a spikelet; b, glume II.; c, glume III.; d, a palea; e, a pistil.

Enum. Pl. Formos. p. 500.

5. **Isachne debilis** RENDLE (Fig. 30); HEMSLEY Ind. Fl. Sin. III. p. 322.

Isachne monticola HACK. (non BÜSE) in Bull. Herb. Boiss. Ser. 2, IV. (1904) p. 528; MATSUM. et HAYATA Enum. Pl. Formos. p. 499.

IV. *Sphærocaryum* NEES.

HOOK. f. Fl. Brit. Ind. VII. p. 246; TRIM. Fl. Ceyl. V. p. 258.

The present genus is represented by a single species *S. elegans* or *Isachne pulchella*. It seems that BENTHAM regarded this genus to be referable to *Isachne*. He gives no account of *Sphærocaryum* in his "Genera Plantarum" Vol. III., but mentions *I. pulchella* in his Flora Hongkongensis which species is regarded by HOOKER to be referable to *S. elegans*. HACKEL says in "Nachträge zur Nat. Pfl.-fam." that he thinks the genus has quite the same character as *Isachne*. As far as my knowledge extends, the spikelets of *Sphærocaryum* is always single-flowered, and the structure is sufficiently different from that of spikelets of *Isachne*. It may be, as HACKEL says, two artificial to arrange *Sphærocaryum* under the Agrostineæ; but it may be quite natural to refer the genus to the Paniceæ and to place it close to *Isachne*.

Sphærocaryum elegans NEES.; HOOK. f. Fl. Brit. Ind. VII. p. 246; RENDL. in HEMSL. Ind. Fl. Sin. III. p. 387; TRIM. Fl. Ceyl. V. p. 258; DUNN et TATCHER Fl. Hongk. et Kwant. p. 317.

Isachne pulchella BENTH. Fl. Hongk. p. 417.

Panicum barbivaginale HAYATA Mater. Fl. Formos. p. 400.

HAB. Kinpori, leg. B. HAYATA, Aug. 1900; Kappanzan, leg. T. Sōma, Oct. 1911.

V. *Panicum* LINN.

Key to the sections.

(Arranged after HOOKER's system given in "Fl. Brit. Ind. VII. pp. 27-28.")

A. Spikelets terete or dorsally compressed.

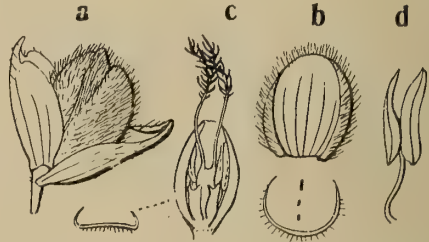


Fig. 30, *Isachne debilis* RENDL.; a, a spikelet; b, a flowering glume; c, a palea with the pistil; d, a stamen.

- I. Branchlets of panicle not produced beyond the terminal spikelets into awn-like bristles.

Spikelets 2-seriate, close-set on the undersurface of the flat rachis of a simple spike, globose or ovoid; awn 0; gl. I. very small, IV. very rugose; perennials; spikes alternate forming a simple raceme. 1. *Paspaloideæ*.

Spikelets 3-4-seriate crowded on the undersurface of a branched spike, ovoid; gl. I half as long as III or shorter, II and III strongly nerved cuspidate or rigidly awned, IV. hard in fruit; annuals; spikes alternate or crowded in usually a simple raceme..... 2. *Echinochloa*.

Spikelets irregularly 1-2-(rarely 3-) seriate on the slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, ovoid or obovoid; gl. I. shorter than half as long as III, II. and III. subequal, awn 0....3. *Brachiaria*.

Spikelets small, crowded in spiciform panicles ovoid or lanceolate, sometimes decurved; gls. usually strongly ribbed, I. much shorter than III., IV., usually much shorter than III., narrow, white. 4. *Hymenachne*.

Spikelets solitary, rarely binate, sessile or pedicelled on the slender branches of a decompound usually open panicle. 5. *Effusæ*.

- II. Branchlets of panicle produced beyond the terminal spikelet into a rigid awn-like bristle.

Spikelets solitary, sessile or pedicelled on the slender branches of a decompound open panicle. Leaves plicate..... 6. *Ptychophyllum*.

- B. Spikelets strongly laterally compressed.

Spikelets very minute, paniced; gl. IV. semilunar, perennial very slender grasses..... 7. *Gibbosæ*.

Sect. I. *Paspaloideæ*.

Panicum punctatum BURM. (Fig. 31); Hook. f. Fl. Brit. Ind. VII. p.

29. "Spikes longer than the internodes, tip usually excurrent setiform,

spikelets $\frac{1}{20}$ – $\frac{1}{16}$ in. plano-convex erecto-patent glabrous, gl. I. very short truncate, II.=about half IV. suborbicular 3-nerved, tip rounded or truncate,

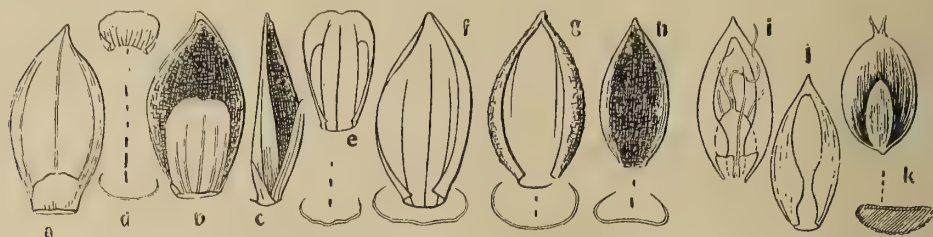


Fig. 31, *Panicum punctatum* BURM.; a, b, c, spikelets, seen from different sides; d, gl. I.; e, gl. II.; f, gl. III.; g, gl. IV.; h, i, j, palea, seen from different sides; k, a caryopsis.

III. ovate acute 3–5-nerved neuter, IV. ovate cuspidately acuminate granulate.”

HAB. Anpin, Sept. 1913, leg. T. SŌMA.

Sect. II. *Echinochloa*.

Panicum Crus-Galli LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 501.

Sect. III. *Brachiaria*.

1. Spikelets 3 mm. long, stem much taller..... 2
Spikelets less than 2 mm. long, smaller grasses..... 3
2. Spikes 4 cm. long, leaves much longer, stem taller.....
..... 1. *P. pseudodistachyum*.
Spikes usually shorter, leaves smaller, stem lower than the preceding species..... 2. *P. distachyum*.
3. Spikelets villose..... 3. *P. villosum*.
Spikelets glabrous. 4. *P. prostratum*.

1. ***Panicum pseudodistachyum*** HAYATA n. n.

Panicum paspaloides HAYATA (non PERS.) Mater. Fl. Formos. p. 401.

2. ***Panicum distachyum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 502.

3. ***Panicum villosum*** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 506.

4. ***Panicum prostratum*** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 505.

Sect. IV. *Hymenachne*.

Much taller plant with longer leaves and spikes; glume IV. membranaceous..... 1. *P. amplexicaule*.

Much smaller grass, with smaller leaves and spikes; glume IV. white crustaceous. 2. *P. indicum*.

1. ***Panicum amplexicaule*** RUDGE; MATSUM. et HAYATA Enum. Pl. Formos. p. 500. = *P. myurus* H. B. et K.

2. ***Panicum indicum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 503.

Sect. V. *Effusae*.

1. Pedicels long barbate.
 Glume IV. coriaceous manifestly granulate.. 1. *P. barbipedum*.
 Gl. IV. coriaceous smooth shining. *P. suishaense*.
 Pedicels not barbate, at most thinly hirsute, glume IV. coriaceous or membranaceous usually smooth.....2.
2. Glume I. very thin, membranaceous nearly enerved very short less than $\frac{1}{3}$ gl. III. in length, truncate or very obtuse.3.
 Glume I. not very thin distinctly nerved more than $\frac{1}{2}$ gl. II. in length acute or obtuse.5.
3. Panicle very much spreading with numerous capillary branches, nearly 30 cm. long.....3. *P. decompositum*.
 Panicle-branches less spreading.....4.
4. Spikelets acute, leaves larger, stem taller..... 4. *P. proliferum*.
 Spikelets obtuse, leaves smaller, stem shorter.....5. *P. repens*.
5. Spikelets less than 2 mm. in length.6.
 Spikelets nearly 4 mm. long..... 6. *P. miliaceum*.
6. Leaves cordate at the base.7.
 Leaves rounded at the base8.
7. Leaves linear-lanceolate.7. *P. montanum*.
 Leaves ovate-lanceolate..... 8. *P. brevifolium*.
8. Pedicels of spikelets spreading nearly right angle... 9. *P. sarmentosum*.
 Spikelets adpressed to the branches of panicles.9.
9. Panicles contracted..... 10. *P. submontanum*.

Panicles very spreading..... 11. *P. acroanthum*.

1. ***Panicum barbipedum*** HAYATA sp. nov. (Fig. 32). Perennis, Rhizoma repens. Caulis basi procumbens ad nodos radicans, internodiis inferioribus $1\frac{1}{2}$ cm. longis, sursum erectus, partibus erectis 15–20 cm. longis, toto glaber sed ad nodos sericeo-hirsutus toto longitudine foliatus. Folia tota caulina, vaginis $2\frac{1}{2}$ cm. longis glabris complanatis latere uno fissis margine uno ciliatis, ligulis e pilis rectis fasciculatis constitutis 1 mm. longis; laminis lanceolatis $4\frac{1}{2}$ cm. longis 7 mm. latis apice acuminatis basi cordatis ad 3 mm.

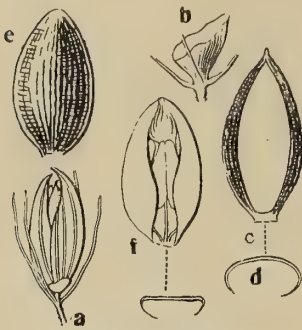


Fig. 32, *Panicum barbipedum* HAYATA; a, a spikelet; b, gl. I.; c, gl. IV.; d, section of the same; e, a palea; f, the same, seen from within.

contractis margine scaberulis prope basin patentociliatis utraque pagine glabris. Panicula terminalis, ramis et ramulis scabris minute hirsutis. Spiculæ pedicellatæ secus rhachin geminatim insitæ, altra longe altra breve pedicellata, pedicellis $\frac{1}{2}$ –1 mm. longis apice barbibus 1–2 instructis scabris, barbibus 1–2 mm. longis ascendentibus; spiculæ cum pedicellis articulatæ oblongæ plus minus complanatæ $1\frac{3}{4}$ mm. longæ 1 mm. latæ apice acutæ; glumæ 4, extima minima hyalina oblique cupuliformis $\frac{1}{2}$ mm. longa, gl. II. oblonga $1\frac{3}{4}$ mm. longa apice acuta basi plus minus contracta apice apiculata 7-nervia glabra, gl. III. subæqualis apice apiculata 3-nervia paleam hyalinam oblongam obtusam fovens, gl. IV. ovata $1\frac{1}{2}$ mm. longa $\frac{3}{4}$ mm. lata apice apiculata dorso minute elevato-tessellata margine interiore incurva indurata paleam fertilem fovens, palea oblonga $1\frac{1}{3}$ mm. longa $\frac{2}{3}$ mm. lata apice obtusa margine carinata nitida dorso plana minute tessellata margine tenuior hyalina basi leviter auriculata. Stamina 3.

HAB. Taitō.

Near *P. repens*, but differs from it in having long barbate pedicels and much smaller leaves and panicles. Remarkable for the very small enerved first glume.

2. ***Panicum suishaense*** HAYATA sp. nov. (Fig. 33). Perennis. Rhizoma suberectum breve; caules cæspitosi cum paniculis 80 cm. alti laxè hirsuti vel subglabri gracillimi teretes medio $\frac{2}{3}$ in diametro. Folia plerumque radicalia

cum vaginis 40 cm. longa erecta, vaginis 8-9 cm. longis dense hirsuto-barbatis pilis patentibus latere uno fisis, ligulis e pilis fasciculatis constitutis 1 mm. longis, laminis linearibus 30 cm. longis 4-5 mm. latis apice acuminatis basi gradatim ad 2 mm. attenuatis haud contractis utraque pagine villosa-barbatis demum subglabratis margine scaberulis ciliatis. Panicula laxissime spiculifera 20 cm. longa 10 cm. lata remotissime ramosa, ramis a se 8 cm. remotis rectis ascendentibus, ramulis sursum plus minus crispatis rectis ascendentibus remotissime spiculiferis. Spiculæ cum pedicellis 2-3 mm. longis longe hirsutis articulatae; gl. I. brevior oblonga 2 mm. longa apice acuta vel obtusa sub-trinervia basi spiculam amplexans glabra; gl. II. ovata $3\frac{1}{2}$ mm. longa longior glabra 7-nervia apice acuta, gl. III. 9-nervia $3\frac{1}{2}$ mm. longa glabra paleam sterilem fovens; gl. IV. crustacea nitida oblonga $2\frac{1}{2}$ mm. longa apice obtusa pallido-flava margine interiore plicata; palea crustacea nitida cum gl. IV. conformis. Caryopsis ellipsoidea 2 mm. longa $1\frac{1}{2}$ mm. lata apice obtusa complanata.



Fig. 33, *Panicum suishaense* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, gl. III.; e, palea of the gl. III.; f, g, gl. IV. seen from different sides; h, palea; i, j, caryopsis, seen from different sides.

HAB. Suisha, leg. B. HAYATA, Aug. 1912.

3. ***Panicum decompositum*** R. BR.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

HAB. Takaw. The specimen before us is very probably the same plant recorded from Formosa under *P. decompositum* by RENDLE. This is perhaps a mere form of *P. proliferum*. So far, we have never seen *P. decompositum* in the island.

4. ***Panicum proliferum*** LAM.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

P. paludosum ROXB.

5. ***Panicum repens*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 505.

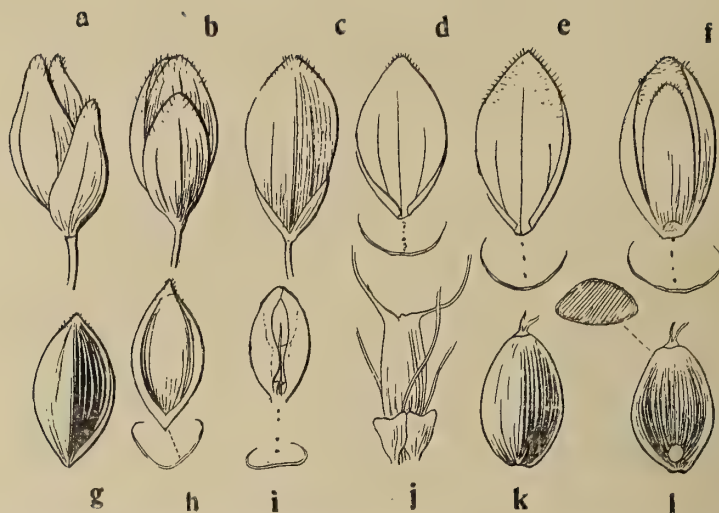


Fig. 34, *Panicum sarmentosum* ROXB.; a, b, c, spikelets, seen from different sides; d, gl. I.; e, gl. II.; f, gl. III, with a sterile palea; g, gl. IV., h, the same, seen from face; i, a fertile palea; j, a pistil with lodicules; k, l, a caryopsis, seen from different sides.

6. ***Panicum miliaceum*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 503.

7. ***Panicum montanum*** ROXB.; HAYATA Fl. Mont. Formos. p. 234.

8. ***Panicum brevifolium*** LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 501.

9. ***Panicum sarmentosum*** ROXB. (Fig. 34); HAYATA Mater. Fl. Formos. p. 402.

10. ***Panicum submontanum*** HAYATA Mater. Fl. Formos. p. 402. *P. Nakaharai* HAYATA Tokyo Bot. Mag. p.

11. ***Panicum acroanthum*** STEUD.; MATSUM. et HAYATA Enum. Pl. Formos. p. 500.

Sect. VI. *Ptychophyllum*.

Panicum excurrens TRIN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 502.

P. plicatum LAM.

P. neurodes SCHULT.

Sect. VII. *Gibbosæ*.

Panicum patens LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 504.

Key to the species.

- | | | |
|----|--|---|
| 1. | Spikes in terminal pairs more than 10 cm. long..... | 1. <i>D. barbata</i> . |
| | Spikes digitate..... | 2 |
| 2. | First glume very minute or sometimes reduced, second glume nearly equalling the third..... | 3 |
| | First glume very minute or entirely reduced, second glume shorter than the third. | <div style="display: inline-block; vertical-align: middle;"> <div style="display: inline-block; vertical-align: middle; font-size: 4em; line-height: 1;">{</div> <div style="display: inline-block; vertical-align: middle;"> 4. <i>D. Henryi</i>.
 5. <i>D. formosana</i>.
 6. <i>D. sanguinale</i>. </div> </div> |
| 3. | Spikes 9-10 cm. long. | 2. <i>violascens</i> . |
| | Spikes nearly 5 cm. long..... | 3. <i>longiflora</i> . |

Ichnanthus pallens MUNRO; MATSUM. et HAYATA Enum. Pl. Formos.
p. 506.

VIII. *Thysanolaena* NEES.

Thysanolaena Agrostis NEES ; MATSUM. et HAYATA Enum. Pl. Formos. p. 516.

IX. *Chamæraphis* R. BR.

Chamæraphis depauperata NEES ; MATSUM. et HAYATA Enum. Pl. Formos. p. 512.

X. *Spinifex* LINN.

Spinifex squarrosus LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 513.

XI. *Oplismenus* BEAUV.

1. Spikelets solitary or clustered in a simple terminal spike.
..... 1. *O. undulatifolius*.
Spikelets in racemose spikes..... 2
2. Stem usually tall with decumbent base, leaves 5-18 cm. long lanceolate, spikes 4-10, 3-10 cm. long, spikelets usually loosely imbricate, awns rather stout. 2. *O. compositus*.
Decumbent, flaccid, leaves 1-3 cm. long, spikes 3-5 short, spikelets secund closely imbricate. 3. *O. Burmanni*.
(The occurrence of the last species in Formosa is doubtful.)

1. **Oplismenus undulatifolius** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 509.

2. **Oplismenus compositus** ROEM. et SCH., MATSUM. et HAYATA Enum. Pl. Formos. p. 509.

3. **Oplismenus Burmanni** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 508.

XII. *Axonopus* BEAUV.

Hook f. Fl. Brit. Ind. VII. p. 64; TRIM. Fl. Ceyl. V. p. 166.

The present genus is not adopted by BENTHAM who regards it to be referable to *Paspalum* (Gen. Pl. III. p. 1098). HACKEL too does not recognize *Axonopus*. As far as I can judge from the study of *Axonopus semialatus*, the structure of the spikelets resembles in some measure that of *Panicum Crus-Galli*. The difference between them exists only in paleæ. They are in *Axonopus* 2-fid, but in *Panicum* entire.

Axonopus semialatus HOOK. f. Fl. Brit. Ind. VII. p. 64; TRIM. Fl. Ceyl. V. p. 166; FORBES et HEMSL. Ind. Fl. Sin. III. p. 334.

Panicum? semi-alatum KTH.; HAYATA Mater. Fl. Formos. p. 402.

HAB. Anpinchin, leg. T. YUBASHI.

XIII. **Arundinella** RADDI.

Arundinella setosa TRIN.; (Fig. 35) MATSUM. et HAYATA Enum. Pl. Formos. p. 515.

XIV. **Setaria** BEAUV.

Key to Species.

1. Panicle lobed, drooping.....1. *S. italica*.
Panicle cylindric.....2
2. Glume rugose.....2. *S. glauca*.
Glume smooth.3
3. Panicle shorter ovate-cylindric, setæ longer..... 3. *S. pachystachys*.
Panicle longer long-cylindric, setæ shorter. 4. *S. viridis*.

1. **Setaria italica** KUNTH; MATSUM. et HAYATA Enum. Pl. Formos. p. 510.

2. **Setaria glauca** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 510.

3. **Setaria pachystachys** FRANCH. et SAV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511

4. **Setaria viridis** BEAUV.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511.

XV. **Pennisetum** PERS.

Pennisetum japonicum TRIN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 511.

Pennisetum japonicum TRIN. var. **viridescens** MIQ.; l.c.

XVI. **Thuarea** PERS.

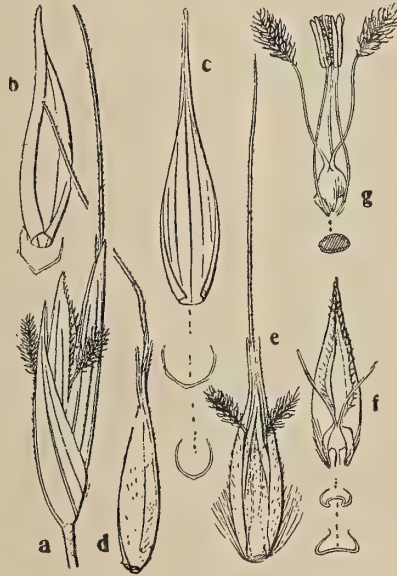


Fig. 35; *Arundinella setosa* TRIN.
a, a spikelet; b, gl. I.; c, gl. II.; d, flowering gl.; e, a flower; f, a palea with the pistil; g, a pistil and stamens.

Thuarea sarmentosa PERS.; HAYATA in Bot. Mag. XXI. p. 50.

XVII. *Oryza* LINN.

Oryza sativa LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 514.

XVIII. *Leersia* SWARTZ.

Leersia hexandra SWARTZ. (Fig. 36) MATSUM. et HAYATA Enum. Pl. Formos. p. 515.

Zizania LINN.

Zizania aquatica LINN.; MATSUM. et HAYATA Enum. Pl. Formos. p. 514.

XX. *Perotis* AIT.

Perotis latifolia AIT. MATSUM. et HAYATA Enum. Pl. Formos. p. 516.

XXI. *Zoysia* WILLD.

Zoysia pungens WILLD.; MATSUM. et HAYATA l.c. p. 515.

XXII. *Coix* LINN.

Coix Lachryma-Jobi LINN.; MATSUM. et HAYATA l.c. p. 513.

XXIII. *Zea* LINN.

Zea Mays LINN.; MATSUM. et HAYATA l.c. p. 514.

XXIV. *Euchlæna* SCHRADER.

Euchlæna luxurians DURIËU (Fig. 37); Bot. Mag. t. 6414.

HAB. Taihoku: Taikanaishō, leg. Y. SHIMADA, 1909.

XXV. *Dimeria* R. BR.

Dimeria ornithopoda TRIN. var. **tenera** HACK.; MATSUM. et HAYATA l.c. p. 508.

XXVI. *Imperata* CYR.

Imperata arundinacea CYR. var. **Koenigii** HACK.; MATSUM. et HAYATA, l.c. p. 517.

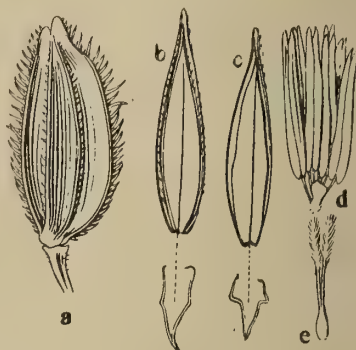


Fig. 36; *Leersia hexandra* Sw. a, a spikelet; b, gl. I.; c, gl. II.; d, stamens; e, pistil.

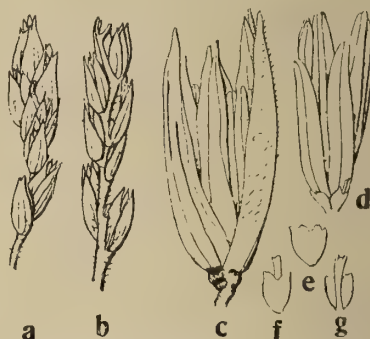


Fig. 37; *Euchlæna luxurians* DURIËU; a, b, male spikes, seen from different sides; c, a spikelet; d, stamens; e, f, g, lodicules, seen from different sides.

XXVII. *Miscanthus* ANDERS.

1. Leaves broader usually 2 cm. wide. 1. *M. japonicus*.
 Leaves narrower usually less than 1 cm. wide 2
2. Branches of panicles few..... 2. *M. transmorrisonensis*.
 Branches of panicles many..... 3
3. Leaves broader 3. *M. sinensis*.
 Leaves narrower. 4. *M. sinensis* var. *formosanus*.
 1. **Miscanthus japonicus** HACK.; MATSUM. et HAYATA, l.c. p. 517.
 2. **Miscanthus transmorrisonensis** HAYATA Mater. Fl. Formos. p. 404.
 3. **Miscanthus sinensis** ANDERS.; MATSUM. et HAYATA l.c. p. 518.
 4. **Miscanthus sinensis** ANDERS. var. **formosana** HACK.; MATSUM. et HAYATA l.c. p. 518.

XXVIII. *Spodiopogon* TRIN.*Key to species.*

1. Spikelets nearly glabrous..... 2
 Spikelets conspicuously barbate..... 3
2. Shortly awned..... 1. *S. tohænsis*.
 Awnless..... 2. *S. formosanus*.
3. Leaves $1\frac{1}{2}$ –2 cm. broad, panicles 20–25 cm. long..... 3. *S. Kawakamii*.
 Leaves less than 1 cm. broad, panicles less than 10 cm. long 4
4. Leaves smaller nearly 5 cm. long. 4. *S. hogænsis*.
 Leaves more than 10 cm. long. 5
5. Spikelets larger, panicles more spreading. 5. *S. tainanensis*.
 Spikelets smaller, panicles contracted. 6. *S. Takeoi*.
 1. **Spodiopogon tohænsis** HAYATA sp. nov. (Fig. 38). Caulis 60–90 cm. altus. Folia radicalia ignota, caulina minora, vaginis 25 cm. longis glabris latere uno fissis, ligulis brevibus ciliolatis truncatis, laminis lanceolatis 10 cm. longis 10 mm. latis apice acuminatis basi plus minus contractis utraque glabris supra scabris subtus lævibus margine scaberrimis. Culmus 50–80 cm. longus glaber teres. Panícula terminalis pyramidalis 15 cm. longa 7–8 cm. lata apice acuminata, ramis primariis vel spicis ad nodos rhachis panicularum subverticillatim 5–10 dispositis a medio sursum spiculiferis

5-6 cm. longis glabris gracillimis complanatis haud scabris, pauce ramosis vel simplicibus. Spiculæ secus rhachin spicarum geminatim dispositæ, altra breve pedicellata altra longe pedicellata, pedicellis 1-2 mm. longis apice obpyramidaliter incrassatis glabris cum spiculis articulatis; spicula oblique

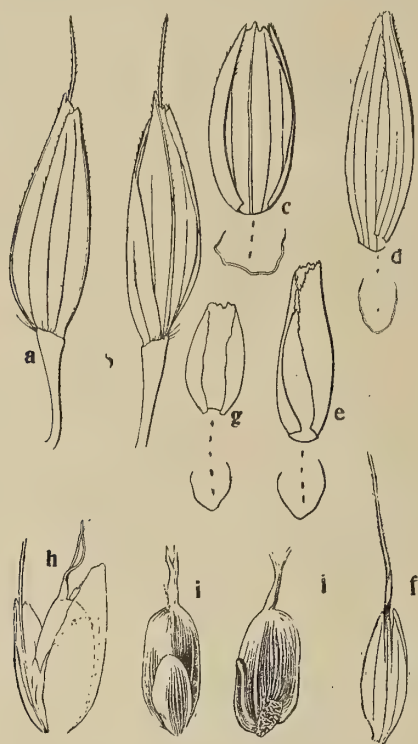


Fig. 38; *Spodiopogon tohensis* HAYATA; a and b, a spikelet, seen from different sides; c, gl. I.; d, gl. II.; e, gl. III.; f, glume IV.; g, a palea; h, caryopsis with the gl. IV. and the palea; i, and j, caryopsis, seen from different sides.

lanceolata 4 mm. longa $1\frac{1}{2}$ mm. lata basi hirsuta cæterum glabra flore uno fovens, glumis 4; gluma I. 9-nervia ovato-oblonga $3\frac{1}{2}$ mm. longa apice truncata mucronibus 3 instructa dorso glabra; gluma II. 9-nervia late oblonga valde concava quam gl. I. plus minus longior apice truncata plus minus mucronata basi dorso hirsuta; gluma III. hyalina gluma I. II. III. æquilonga 3 mm. longa apice truncata apice ciliolata; gluma IV. hyalina 2 mm. longa oblonga apice alte 2-lobata, lobis acutissimis inter lobos arista instructa, arista 3 mm. longa basi torta. Caryopsis obovoideo-ellipsoidea $2\frac{3}{4}$ mm. longa 1 mm. lata apice rotundata basi plus minus angustior.

HAB. Mt. Tohozan, 6500 ped. alt., leg. S. SASAKI, Oct. 1909.

Near *S. formosanus* RENDLE, but differs from it in the awned glumes.

2. *Spodiopogon formosanus*

RENDLE; MATSUM. et HAYATA l.c. p. 250.

3. *Spodiopogon Kawakamii* HAYATA in Bot. Mag. (Tōkyō) XXI. p. 54.

4. *Spodiopogon hogōensis* HAYATA sp. nov. Rhizoma ignotum. Caulis erectus 60-90 cm. longus teres, internodiis 7-10 cm. longis $1\frac{1}{2}$ mm. latis purpurascens ramosus, ramis foliatis. Folia approximata sita, vaginis

2-2½ cm. longis latere uno fissis glabris, ligulis hyalinis membranaceis erosis brevibus, setis auricularibus 2 mm. longis paucis; laminis lanceolato-linearibus 6-7 cm. longis 4-5 mm. latis apice acuminatis basi ad 1 mm. contractis utraque glabris margine scaberulis. Panícula terminalis cylindrica 9 cm. longa 2 cm. lata, ramis et ramulis tenuiter pubescentibus vel glabris toto erectis rectis vel plus minus crispis. Spiculæ secus rhachin ramulorum geminatim sitæ, altra sessili altra pedicellata, omnibus basi cum rhachibus vel cum pedicellis articulatis; spicula basi dense hirsuta supra basin longe barbata, barbis 3 mm. longis, lanceolata 5 mm. longa; gl. I. 9-nervia 4 mm. longa apice mucronata dorso dense barbata margine hirsuta vel glabra, gl. II. cum gl. I. conformis sed apice obtusa haud mucronata; gl. III. cum gl. I. conformis sed 5-nervia minus barbata haud mucronata paleam sterilem gerens, gl. IV. florens lanceolata hyalina 3-nervia 3 mm. longa apice alte 2-lobata inter lobos arista 7 mm. longa basi torta instructa.

HAB. Musha: Hōgō, ad 4000 ped. alt., leg. B. HAYATA, Aprili. 1916.

Remarkable for the much smaller leaves than those of other species, and much contracted panicles.

Spodiopogon Sibiricus TRIN.; MATSUM. et HAYATA l.c. p. 521.

The occurrence of this species in the island is very doubtful.

5. **Spodiopogon tainanensis** HAYATA in Bot. Mag. (Tōkyō) XXI. p. 53.

6. **Spodiopogon Takeoi** HAYATA sp. nov. (Fig. 39). Perennis. Rhizoma repens teres 2 mm. in diametro nodosum ad nodos radicans. Caulis distans basi ascendens sursum erectus 80 cm. longus glaber teres, internodiis 8 cm. longis 1½ mm. in diametro. Folia radicalia (plerumque caduca), caulina distantia, vaginis glabris 7-10 cm. longis latere uno fissis, ligulis 1½ mm. longis 3 mm. latis margine minute ciliolatis truncatis setis auricularibus patentibus crispatis 2-3 mm. longis; laminis linearibus 10-13 cm. longis 1 cm. latis apice acuminatis basi ad 2 mm. contractis utraque pagine glabris. Panícula terminalis in ambitu pyramidalis, ramis primariis ad nodos rachis secunde fasciculatis rectis plus minus crispatis patentibus glabris sursum ramulosis, ramulis gracillimis crispatis glabris apice plus minus incrassatis cum spicula articulatis; spiculæ ad apicem ramulorum ternatim dispositæ, una sessili, duobus pedicellatis. Spicula sessilis dense longe hirsuta 1-florata,

flore hermaphrodito, glumis 4; gl. I. oblonga 3 mm. longa 1 mm. lata apice obtusa basi plus minus contracta concava dorso longe hirsuta pilis circ. 2 mm. longis dorso prominente 7-nervia apice obtusa; gl. II. oblonga 3 mm. longa apice obtusa dorso longe hirsuta versus marginem glabra membranacea 5-nervia, nervis prominentibus; gl. III. hyalina tenuissima 3 mm. longa apice obtusa margine apiceque hirsuta caeterum glabra paleam linearem amplexans; gl. IV. linearis 3 mm. longa apice alte 2-lobata, lobis $1\frac{1}{2}$ mm. longis acuminatis ad centrum arista 7 mm. longa basi torta instructa hyalina; palea oblonga 2 mm. longa 1 mm. lata hyalina apice hirsuta. Stamina 3. Styli 2, a medio sursum plumosi; spiculæ pedicellatæ, pedicellis longe hirsutis 2 mm. longis, pilis 2 mm. longis; glumæ 4 utæ floris spiculæ sessilis.

HAB. Nantō: Shijō, leg. T.Ito, Oct. 1916.

Near *S. tainanensis* HAYATA, but differs from it in the smaller spikelets and in the less patent panicles.

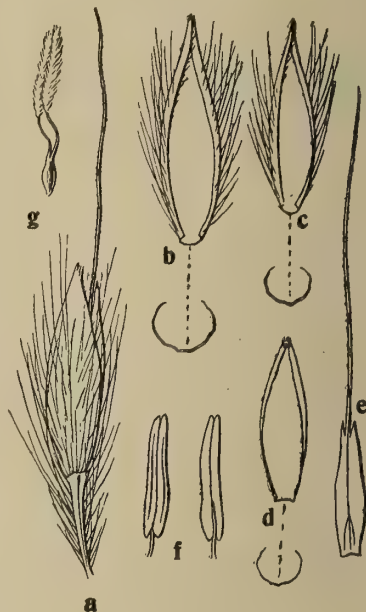


Fig. 39, *Spodiopogon Takeoi* HAYATA. a, a pedicellate spikelet; b, a gl. I.; c, gl. II.; d, gl. III.; e, gl. IV.; f, stamens; g, a pistil.

XXIX. *Pollinia*.

Key to the species.

1. Spikelets with geniculate stalks above the articulation of pedicels. 2
Spikelets without stalks above the articulation of pedicels..... 3
2. Spikes 8-10-fasciculate, spikelets densely arranged... 1 *P. geniculata*.
Spikes 3-4-fasciculate, spikelets loosely arranged..... 2. *P. Fauriei*.
3. Spikelets awnless..... 3. *P. imberbis* var. *Willdenowiana*.
Spikelets awned 4
4. Glume II. and IV. awned. 4. *P. formosana*=*P. monantha* var. *formosana*.
Glume II. awnless. gl. IV. awned. 5

5. Internodes of rhachis 2 or 3 times longer than sessile spikelets.
 5. *P. arisanensis*.
 Internodes of rhachis nearly equal to or shorter than spikelets..... 6.
 6. Spikelets larger 6. *P. ciliata*.
 Spikelets smaller. 7. *P. monantha*.

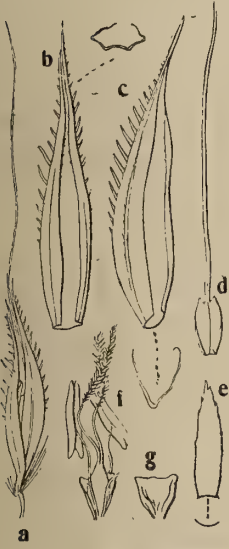


Fig. 40, *Pollinia geniculata* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, stamens and a pistil; g, a lodice.

1. ***Pollinia geniculata*** HAYATA sp. nov. (Fig. 40). 80–90 cm. alta toto longitudine usque ad basin spicæ foliata. Folia distantia alterna lanceolata 10–20 cm. longa 8–10 mm. lata apice acuminata basi attenuata margine scabra utraque pagine tenuiter hirsuta, ligula 2 mm. longa totiusque lata truncata ciliata, vagina versus apicem marginemque hirsuta extus intusque glabra 11 cm. longa. Spicæ 9–10 subdigitatim ad apicem caulis dispositæ; rhachis panicularum 3 cm. longa plus minus flexuosa. Spica singula 5–13 cm. longa plus minus recurvata multi-nodosa, internodiis 4 mm. longis complanatis subglabris, ad nodos hirsuta. Spiculæ geminatim ad nodos dispositæ, altra sessili altra pedicellata, pedicellis 3 mm. longis apice hirsutis basi cum partibus productis spiculæ sessilis connatis; spiculæ sessiles fusiformes 6 mm. longæ 1 mm. latæ apice acuminatæ basi obtusæ ad stipitem 1 mm. longum hirsutum cum rhachi plus minus connatum

geniculato-recurvum attenuatæ; gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata plus minus bidentata dorso 2-carinata ad carinas aristato-ciliata caeterum glabra; gl. II. lanceolata 4 mm. longa apice acuminata dorso 1-carinata ad carinas aristato-ciliata; gl. florens minuta hyalina 1 mm. longa $\frac{1}{2}$ mm. lata apice acuminata ad aristam $1\frac{1}{2}$ cm. longam abeuns; palea hyalina minuta.

HAB. Arisan, leg. B. HAYATA, Jan. 1912.

Differs from all other species, in the spikelets having geniculate stalks above the articulation of pedicels.

2. ***Pollinia Fauriei*** HAYATA sp. nov. (Fig. 41). Culmus basi prostratus,

internodiis inferioribus 4 cm. longis, ad nodos radicans usque supra medium foliatus superne ascendens erectus. Folia distantia media linearia 7 cm. longa

4 mm. lata apice acuminata basi attenuata utraque glabra haud hirsuta, ligula membranacea 2 mm. longa totiusque lata apice truncata glabra, vagina 5 cm. longa. Spica 3-4-subdigitatim ad apicem culmi disposita 4-6 cm. longa, internodiis complanatis 5 mm. longis, ad nodos hirsuta. Spicula ad nodos geminatim disposita, altera sessili altera pedicellata; gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata 2-dentata 2-carinata ad carinas valde aristato-ciliata caeterum glabra; gl. II. lanceolata 4 mm. longa apice acuminatissima dorso 1-carinata ad carinam aristato-ciliata; gl. florens minuta hyalina $1\frac{1}{2}$ mm. longa $\frac{1}{3}$ mm. lata apice arista 2 cm. longa geniculata instructa; palea minuta hyalina $1\frac{1}{2}$ mm. longa lanceolata apice obtusa.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Pollinia geniculata* HAYATA, but distinguishable from it in the broader lanceolate glumes, and not stalked spikelets.

3. *Pollinia imberbis* NEES.
var. *Willdenowiana* HACK. (Fig. 42) MATSUM. et HAYATA, l.c. p. 521.

4. *Pollinia arisanensis* HAYATA sp. nov. (Fig. 43). Caulis 30-40 cm. longus basi repens ad nodos radicans a basi usque medium remotissime foliatus. Folia media ovato-lanceolata circ. 4 cm. longa 4-5 mm. lata apice acuminata basi

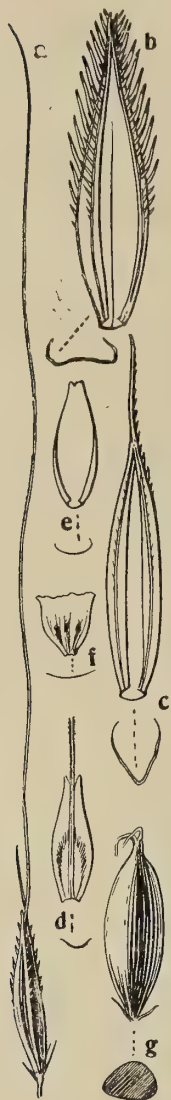


Fig. 41, *Pollinia Fauriei* HAYATA. a, spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, a lodice; g, a caryopsis.



Fig. 42, *Pollinia imberbis* NEES. var. *Willdenowiana* HACK. a, b, a portion of a spike, seen from different sides.

obtusa margine laevis sed sursum scaberrima supra parcissime hirsuta vel glabra subtus glabra, ligula minuta $\frac{1}{2}$ mm. longa totiusque lata truncata ciliata membranacea, vagina 8 cm. longa apice truncata longe barbata, barbis 2-3 mm. longis. Spicæ solitariae vel geminatim dispositæ terminales simplices

vel pauce ramosæ 4-5 cm. longæ, internodiis 1 cm. longis semiteretibus lævibus, ad nodos barbatae cæterum glabræ; spiculæ geminatim ad nodos rhachillæ dispositæ, altera sessili altera pedicellata, pedicellis 3-4 mm. longis glabris; spicula sessilis: gl. I. lanceolata $4\frac{1}{2}$ mm. longa 1 mm. lata apice acuminata apice 2-dentata margine hirsuta basi extus hirsuta dorso 2-carinata; gl. II. conformis dorso 1-carinata; gl. florens hyalina 1-nervia $1\frac{1}{2}$ longa $\frac{1}{3}$ mm. lata apice 2-dentata vel acuminata inter dentes arista scabra 13 mm. longa instructa. Caryopsis cylindrica 2 mm. longa $\frac{1}{3}$ mm. lata.

HAB. Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *Pollinia nuda* TRIN., but differs from it in the pedicelled spikelets which are in this new species much longer stalked than those of *P. nuda*.

Fig. 43, *Pollinia arisanensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, a palea; f, a caryopsis.

7-8 cm. longis, sursum erectus toto longitudine foliatus. Folia alterna distantia lanceolata 7-8 cm. longa 7 mm. lata apice acuminata basi attenuata margine scabra supra minus subtus plus hirsuta, vagina 4 cm. longa apice dorso hirsuta, ligula membranacea 1 mm. longa apice truncata hirsuta hyalina. Spicæ



Fig. 44, *Pollinia formosana* HAYATA; a, a sessile spikelet; b, gl. I.; c, gl. II.; d, a palea; e, a stamen; f, a caryopsis; the longer awn in fig. a is the gl. III.

5. *Pollinia formosana* (HACK.) HAYATA sp. nov. (Fig. 44). Caulis 50-60 cm. longus basi repens ad nodos radicans, internodiis inferioribus 2-3 cm. longis 1 mm. in diametro, superiore ascendens, internodiis superioribus

versus apicem caulis subdigitatim vel oppositim 5-7 dispositæ, rhachibus 1-2 cm. longis; spicis 4 cm. longis gracilibus, rhacheola hirsuta, internodiis $2\frac{1}{2}$ mm. longis cylindrico-clavatis semiteretibus; spiculæ geminatim ad nodos rhachillæ dispositæ, altra sessili altra pedicellata; spicula sessilis: gl. I. lanceolata 3 mm. longa apice acuminata prope marginem 2-costata, ad costas aristato-ciliolata; gl. II. ovato-oblonga $2\frac{1}{2}$ mm. longa apice acuminata ad aristam 3 mm. longam abeuns dorso sursum costata ad costam scabrida; gl. florens aristæformis filiformis 13 mm. longa plus minus crispata tortuosa basi plus minus dilatata membranacea hyalina, palea minuta oblonga $\frac{1}{3}$ mm. longa. Stamina 3. Spicula pedicellata, pedicellis quam internodiis rhachillæ pauro brevioribus hirsutis semi-teretibus.

Pollinia monantha HAYATA in MATSUM. et HAYATA (non NEES) l.c. p. 522.

Pollinia monantha NEES. var *formosana* HACK.

HAB. Kōtōshō leg. K. MIYAKE, Nov. 1899.

Near *Pollinia monantha* NEES., but distinguishable from it specifically in the spikelets which are awned in both gl. II. and III.

6. *Pollinia ciliata* TRIN.; MATSUM. et HAYATA l.c. p. 521.

7. *Pollinia monantha* NEES.; HAYATA in General Index to the Flora of Formosa p. 99.

XXX. *Polliniopsis* HAYATA n. g.

Polliniopsis Somai HAYATA sp. nov. (Fig. 45).

Calmus basi repens ad nodos radicans, internodiis 2-3 cm. longis, sursum ascendens 30-40 cm. longus glaber a basi usque ad medium foliatus. Folia lanceolata 4 cm. longa 5 mm. lata apice acuminata basi obtusa membranacea utraque glabra haud scabra sed lævia basi margine barbis 2 mm. longis 3-5 instructa, ligula 1 mm. lata $\frac{1}{3}$ mm. longa ciliolata, vagina 2-3 cm. longa margine hirsuta. Spicæ geminæ ad apicem culmi terminales circ. 8 cm. longæ graciles recurvæ, rhachibus rectis haud reflexis glabris, internodiis spicæ 5 mm. longis complanatis glabris lævibus haud vel vix hirsutis. Spiculæ

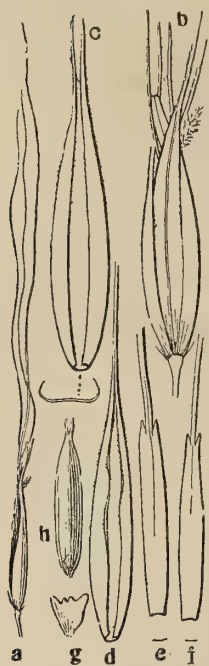


Fig. 45, *Polliniopsis Somai* HAYATA; a, a spikelet; b, the same more magnified, awns partly taken off; c, gl. I.; d, gl. II.; e, gl. III.; f, gl. IV.; g, a lodicel; h, a young caryopsis.

geminatim ad nodos rhachis spicæ dispositæ pedicellatæ, pedicello altro longiore altro brevior; gl. I. lanceolata 5 mm. longa 1 mm. lata apice acuminata et 2-aristata, aristis 1 mm. longis, margine interiore plicata basi hirsuta cæterum glabra; gluma II. lanceolata 3 mm. longa apice acuminata apice arista 8 mm. longa instructa margine sursum ciliata; gl. III. linearis 2 mm. longa $\frac{1}{2}$ mm. lata hyalina apice 2-dentata, inter dentes arista 10 mm. longa instructa, arista basi plicato-geniculata; gl. IV. cm. III. conformis; palea?

HAB. Mentenzan, leg. T. SOMA, Nov. 1914.

Near *Pollinia*, but differs from the genus in having binate spikelets which are both pedicellate, and in the 2-aristate gl. I., 1-long awned glumes, II., III. and IV.

XXXI. *Saccharum* LINN.

1. Hairs on the callus equal or shorter than spikelets1. *S. Narenga*.
Hairs on the callus much longer than spikelets.2
2. Stem hairy below the panicles.....2. *S. spontaneum*.
Stem glabrous below the panicles.3. *S. officinale*.
 1. **Saccharum Narenga** HAM.; MATSUM. et HAYATA l.c. p. 519.
 2. **Saccharum spontaneum** LINN.; MATSUM. et HAYATA l.c. p. 519.
 3. **Saccharum officinarum** LINN.; MATSUM. et HAYATA l.c. p. 519.

XXXII. *Erianthus* MICH.

1. Hairs of spikelets more or less purple.1. *E. pollinioides*.
Hairs of spikelets more or less brown.2. *E. formosanus*.
 1. **Erianthus pollinioides** RENDLE; MATSUM. et HAYATA l.c. p. 520.
 2. **Erianthus formosanus** STAFF; MATSUM. et HAYATA l.c. p. 520.

XXXIII. *Ischæmum* LINN.

Key to Species.

1. Rhachis of spikes densely long barbate at the nodes only.
..... 1. *I. angustifolium*.
Rhachis of spikes not barbate at the nodes..... 2
2. Spikes solitary.....2. *I. muticum*.
Spikes binate or ternate..... 3
3. Outer glumes densely or loosely barbate..... 4
Outer glumes nearly glabrous3. *I. Sieboldii* var. *formosanum*.

4. Outer glumes densely barbate.4. *I. aristatum*.
 Outer glumes loosely barbate.5. *I. ciliare*.
 1. ***Ischæmum angustifolium*** HACK.; MATSUM. et HAYATA l.c. p. 525.
 2. ***Ischæmum muticum*** LINN.; MATSUM. et HAYATA l.c. p. 523.
 3. ***Ischæmum Sieboldi*** MIQ. ***formosanum*** HACK.; MATSUM. et HAYATA l.c. p. 527.
 4. ***Ischæmum aristatum*** LINN. var. ***imberbe*** HACK.; MATSUM. et HAYATA l.c. p. 525.
 5. ***Ischæmum ciliare*** RETZ.; MATSUM. et HAYATA l.c. p. 525.

XXXIV. *Eremochloa* S. WATS.

Key to Species.

1. Leaves 2-4 cm. long.1. *E. ophiuroides*.



FIG. 46, *Eremochloa ophiuroides* HACK. var. *longifolia* HAYATA; a, a portion of a spike; b, the same, seen from another side; c, spikelets, one fertile, the other sterile; d, the same, seen from another side; e, gl. I.; f, section of the same; g, gl. II.; h, gl. III.; i, palea of gl. III. with stamens only; j, stamens; k, the lodicule, at the base of the same stamens; l, gl. IV.; m, palea of gl. IV.; n, stamens and a pistil in the gl. IV.; o, pistil; p, sterile spikelet.

Leaves usually 10 cm. longa.

Spikes much longer.2. *E. ophiuroides* var. *longifolia*.

1. ***Eremochloa ophiuroides*** HACK.; HAYATA in Bot. Mag. (Tōkyō) XXI p. 50.

2. ***Eremochloa ophiuroides*** HACK. var. ***longifolia*** HAYATA. Caulis basi repens supra basin ascendens sursum erectus a basi usque ad medium foliatus. Folia linearia, lamina 10 cm. longa 2 mm. lata apice ob-

tusa basi plus minus contracta utraque pagine glabra margine medio deorsum lævis sed sursum prope apicem aristato-scabra, ligula brevissima $\frac{1}{8}$ mm. longa hirsuta, vagina 3 cm. longa prope apicem longe barbata, barbis 2 mm. longis. Spica solitaria terminalis 5 cm. longa $1\frac{1}{2}$ mm. lata. Cæterum ut typica.

HAB. Tainan, leg. T. SŌMA, Aug. 1914.

Differs from the type in having much longer spikes and longer leaves.

XXXV. *Pogonatherum* BEAUV.

Pogonatherum saccharoideum BEAUV. var. *monandrum* HACK.
MATSUM. et HAYATA l.c. p. 522.

XXXVI. *Arthraxon* BEAUV.

Arthraxon ciliaris BEAUV. var. *Langsdorffii* HACK.; MATSUM. et HAYATA l.c. p. 523.

XXXVII. *Apluda* LINN.

Apluda mutica LINN.; MATSUM. et HAYATA l.c. p. 532.

XXXVIII. *Rottboellia* LINN.

Key to species.

1. Spike larger erect 9 cm. long 4 mm. broad.

..... 1. *R. exaltata* var. *appendiculata*.

Spike slender more or less recurved 5-6 cm. long 2 mm. broad.

..... 2. *R. compressa*.

1. *Rottboellia exaltata* LINN. var. *appendiculata* HACK.; MATSUM.
et HAYATA l.c. p. 524.

2. *Rottboellia compressa* LINN. var. *genuina* HACK.; MATSUM. et
HAYATA l.c. p. 523.

XXXIX. *Manisuris* LINN.

Manisuris granularis LINN.; MATSUM. et HAYATA l.c. p. 524.

XL. *Ophiurus* R. BR.

Ophiurus monostachyus PRESL.; MATSUM. et HAYATA l.c. p. 524.

XLI. *Andropogon* LINN.

Key to species.

1. Pedicels of spikes enclosed in spathiform leaf-sheaths. 1. *A. brevifolius*.

Pedicels of spikes not enclosed in spathiform leaf-sheaths..... 2

2. Rhachis and pedicels of upper spikelets with translucent channel.... 3
Rhachis and pedicels of upper spikelets opaque. 5
3. Spikes with many pairs of spikelets. 4
Spikes with 1-3(4) spikelets..... 2. *A. micranthus*.
4. Spikes digitate or fascicled, lower ones longer than rachis of inflorescence..... 3. *A. Ischæmum*.
Spikes much shorter than rachis of inflorescence.... 4. *A. intermedius*.
5. Stalked spikelet neuter, unawned.

..... 5. *A. kwashotensis*.

Stalked spikelet bisexual, awned.

..... 6. *A. formosanus*.

1. **Andropogon brevifolius** SWARTZ;
MATSUM. et HAYATA l.c. p. 528.

2. **Andropogon micranthus** KUNTH;
MATSUM. et HAYATA l.c. p. 529.

3. **Andropogon Ischæmum** LINN.; MATSUM. et HAYATA l.c. p. 529.

4. **Andropogon intermedius** R. BR
MATSUM. et HAYATA l.c. p. 528.

5. **Andropogon kwashotensis** HAYATA
sp. nov. (Fig. 47). Perennis. Caulis la
ascendens 20-30 cm. altus sursum erectus basi
vaginis oblongis lanceolatis obtusis instructus a
basi sursum vaginis foliorum toto obtectus.
Folia radicalia haud visa caulina distiche
disposita, vaginis (plerumque) 2-3 cm. longis 1-1½
mm. latis glabris latere uno fissis, ligulis ½ mm.
longis 2 mm. latis truncatis margine minute
ciliolatis, laminis linearibus 7-8 cm. longis 5
mm. latis apice acuminatis basi ad 2 mm.
contractis utraque pagine glabris margine
scabris basi prope ligulas longe barbatis, barbis
5 mm. longis rectis patentibus; foliis caulinis

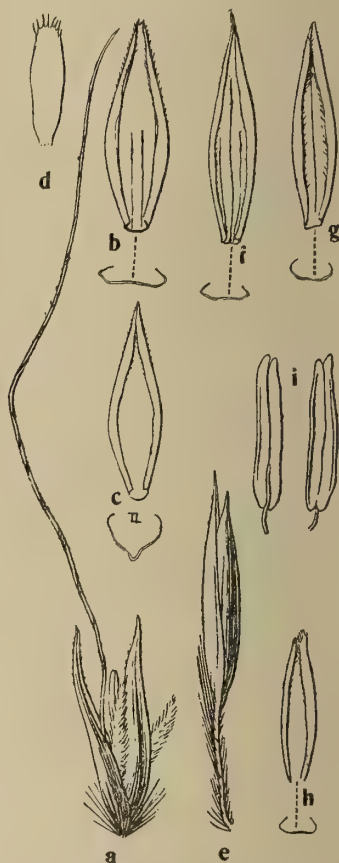


Fig. 47, *Andropogon kwashotensis* HAY. a, sessile spikelet; b, glume I. of the same; c, glume II. of the same; d, glume III. of the same; e, pedicelled spikelet; f, glume I. of the same; g, glume II. of the same; h, glume III. of the same; i, stamens.

superioribus ad bracteas abeuntibus; bracteis singulis vel duobus basi paniculæ insitis, vaginis valde conspicuis laminis valde reductis, vaginis 6–8 cm. longis deorsum tubuliformibus sursum dilatis laminiformibus 5 mm. longis alabastrum paniculæ obtegentibus, laminis valde reductis convoluto-setiformibus 1–3 cm. longis. Panicula pyramidalis 6 cm. longa 2 cm. lata, rhachis glabra gracillima ad nodos longe hirsuta, pilis albis 2 mm. longis, vel versus ramulos rhachis hirsuta; spiculæ secus spicæ rhachin articulata ad nodos geminatae, altræ sessili, altræ stipitata; spiculæ sessiles lanceolatae $3\frac{1}{2}$ mm. longæ $\frac{3}{4}$ mm. latæ apice acuminatae; flore uno hermaphrodito; gluma I. lanceolata $3\frac{1}{2}$ mm. longa $\frac{3}{4}$ mm. lata apice obtusa apice margineque ciliato-hirsuta extus intusque glabra margine sursum carinata; gluma II lanceolata $3\frac{1}{2}$ mm. longa dorso valde plicato-carinata apice acuminata margine plicato-recurva ciliata; gluma III. multo minora linearis 2 mm. longa $\frac{2}{3}$ mm. lata apice truncata hyalina apice ciliata; gluma IV. ad aristam rigidam tortam superne geniculatam $1\frac{1}{2}$ cm. longam reducta; palea O. Spiculæ altræ pedicellis longe hirsutis 2 mm. longis stipitatae lineari-lanceolatae 4 mm. longæ acuminatae; gluma I. lineari-lanceolata 4 mm. longa $\frac{3}{4}$ mm. lata multi-nervia margine apice hirsuta; gluma II. lanceolata acuminata $3\frac{1}{2}$ mm. longa $\frac{1}{2}$ mm. lata haud carinata margine interiore plicata margine hirsuta; gluma III. lanceolata hyalina margine tenuiter plicata ciliolata; gl. IV. minute lanceolata $1\frac{1}{2}$ mm. longa $\frac{1}{4}$ mm. lata, florem masculinum gerens. Stamina 3, antheris linearibus $1\frac{1}{2}$ mm. longis $\frac{1}{4}$ mm. latis.

HAB. Kwashotō, leg. T. SŌMA, Juli. 1915.

Near *A. micranthus* KUNTH, but differs from it in the quite lusterless nervose spikelets.

6. **Andropogon formosanus** RENDLE; MATSUM. et HAYATA l.c. p. 528.

XLII. *Sorghum* PERS.

Key to species.

1. Joints, pedicels and callus shortly villous with purple or rufous hairs. 1. *S. fulvum*.
Joints, pedicels and callus shortly villous, but not with purple or rufous hairs. 2
2. Rachis of spike tenacious. 2. *S. vulgare*.

Rachis of spike fragile..... 3. *S. halepense*,

1. **Sorghum fulvum** BEAUV.; FORBES et HEMSLEY Ind. Fl. Sin. III.
p. 367.

Andropogon serratus THUNB.; MATSUM. et HAYATA l.c. p. 530.

2. **Sorghum vulgare** PERS.; MATSUM. et HAYATA l.c. p. 531.

3. **Sorghum halepense** PERS.; FORBES et HEMSL. Ind. Fl. Sin. III.
p. 367; HAYATA Gen. Ind. Fl. FORMOS. p. 99.

XLIII. *Chrysopogon* TRIN.

Chrysopogon aciculatus TRIN.; FORBES et HEMSL. Ind. Fl. Sin. III.
p. 368.

Andropogon aciculatus RETZ.; MATSUM. et HAYATA l.c. p. 527.

XLIV. *Cymbopogon* SPR.

Cymbopogon Nardus RENDLE=*Andropogon Nardus* LINN.

Subsp. **hamatidus** HACK.; FORBES et HEMSL. Ind. Fl. Sin. III.
p. 376.

Subsp. **marginatus** var. **Goeringii** HACK. l.c. p. 376.

XLV. *Heteropogon* PERS.

Heteropogon contortus BEAUV.; FORBES et HEMSL. Ind. Fl. Sin. III.
p. 366.

=*Andropogon contortus* LINN.; MATSUM. et HAYATA l.c. p. 528.

XLVI. *Themeda* FORSK.

Themeda gigantea HACK. subsp. **caudata** HACK.; MATSUM. et HAYATA
l.c. p. 532.

XLVII. *Alopecurus* LINN.

Key to species.

Glumes 2 distinct. 1. *A. æqualis*.

Glumes 2 connate to half-way up. 2. *A. Agrostis*.

1. **Alopecurus æqualis** SOBOL.; MATSUM. et HAYATA l.c. p. 533.

2. **Alopecurus Agrostis** LINN.; HAYATA in Bot. Mag. (Tōkyō) XXI.
p. 55.

XLVIII. *Polypogon* DESF.

Key to species.

1. Awn equal to the glumes. 1. *P. Higegarveri*.

Awn much longer than the glumes..... 2. *P. monspeliensis*.

1. **Polypogon Higeaweri** STEUD.; MATSUM. et HAYATA l.c. p. 535.

2. **Polypogon monspeliensis** DESF.;

MATSUM. et HAYATA l.c. p. 535.

XLIX. *Sporobolus* R. BR.

Key to species.

1. Glume I. II. III. and palea subequal.
..... 1. *S. virginicus*.

Glume I. and II. are much shorter than
fl. glume and palea.... 2. *S. indicus*,
..... 3. *S. diandrus*.

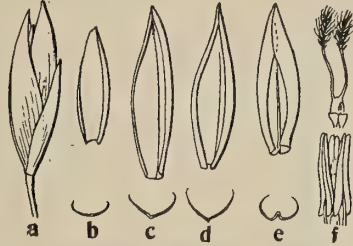


Fig. 48, *Sporobolus virginicus* KUNTH. a, spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, stamens; h, a pistil; all figures variously magnified.

1. **Sporobolus virginicus** KUNTH. (Fig. 48); MATSUM. et HAYATA l.c. p. 534.

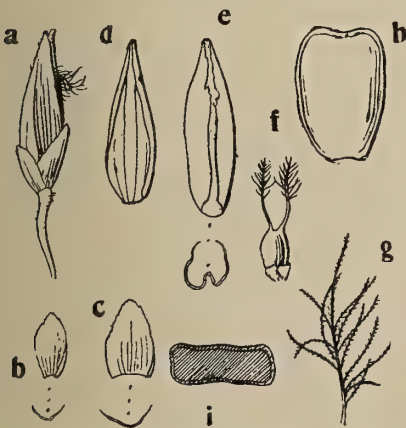


Fig. 49, *Sporobolus indicus* R. BR. a, a spikelet; b, gl. I.; c, gl. II.; d, flowering glume; e, a palea; f, a pistil; g, portion of the style; h, a caryopsis; i, section of the same; all figures variously magnified.

2. **Sporobolus indicus** R. BR. (Fig. 49); MATSUM. et HAYATA l.c. p. 534.

3. **Sporobolus diandrus** BEAUV.; MATSUM. et HAYATA l.c. p. 533, very near to the preceding species.

L. *Agrostis* LINN.

Key to species.

1. Glume III. awned. 2
Glume III. usually awnless very rarely shortly awned. 3
2. Glume I. 5 mm. long.

..... 1. *A. suizanensis*.
Glume I. 3 mm. long.

..... 2. *A. transmorrisonensis*.

Glume I. 2 mm. long..... 3. *A. sozanensis*.

3. Leaves very narrow, nearly filiformed. 4. *A. morrisonensi*.

Leaves 2-3 mm. broad linear..... 5. *A. perennans*.

1. **Agrostis suizanensis** HAYATA sp. nov. (Fig. 50). Culmus erectus caespitosus gracilis glaber sed plus minus scaber 50-60 cm. longus teres. Folia basi caulis multo disposita inferiora breviora cum vaginis 8-20 cm.

longa; lamina mediana linearis 5–15 cm. longa convoluto-teres 1 mm. lata apice acuminata basi supra (intus) hirsuta subtus (extus) glabra 5-nervata, nervis validis, vagina 2–5 cm. longa convoluto-tereti; ligula membranacea 2 mm. lata 1 mm. longa apice truncata denticulata glabra. Panicula cylindrica 6 cm. longa 7 mm. lata, ramis primariis erecto-ascendentibus scabris rectis. Gl. I. lanceolata 4 mm. longa 1 mm. lata apice acuminata glabra 1-nervia, valde secus medium plicata dorso 1-carinata, ad carinas scaberrima. Gluma II. conformis longiora 5 mm. longa. Gluma III. hyalina ovato-lanceolata 4 mm. longa subconvoluta extus scabra apice 2-setulis instructa, dorso prope basin a basi ad 1 mm. altitudinem arista 6–7 mm. longa instructa. Palea hyalina medio 2-carinata, ad carinas scaberrima. Rhachilla supra glumas I. et II. breve hirsuta, pilis 1 mm. longis, partibus productis rhachillæ 1 mm. longis dense hirsutis.

HAB. Suizan, leg. T. SÔMA, Dec. 1914.

Nothing like this in the floras of India, China and Japan. The spikelets of this species are far much larger than any of other species. The general aspect of this new grass is entirely that of a species of *Calamagrostis*; but the callus at the base of glume III. are in the new one naked or very slightly hairy—the character which is, according to HOOKER, assigned to *Agrostis*.

2. ***Agrostis transmorrisonensis*** HAYATA sp. nov. (Fig. 51). Culmus

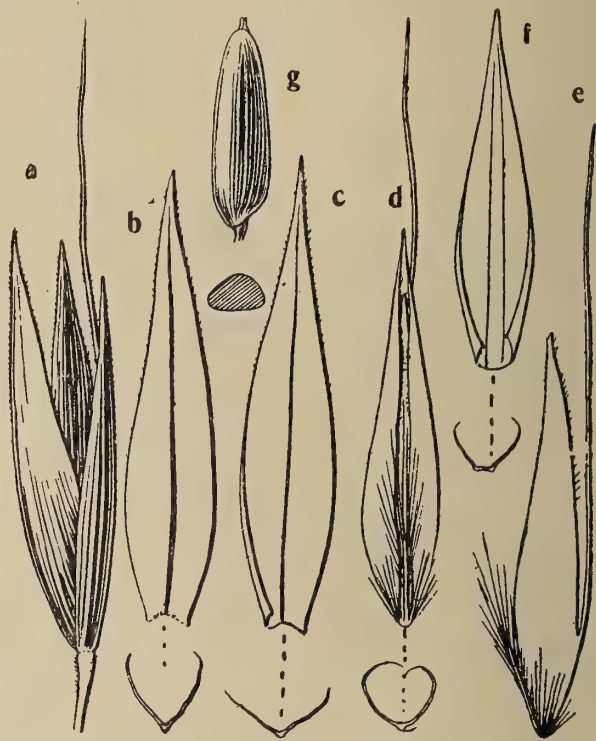


Fig. 50, *Agrostis suizanensis* HAYATA. a, a spikelet; b, glume I; c, glume II; d, a flowering glume with its palea and a prolonged portion of the rhachilla; e, the same, seen from side; f, palea; g, caryopsis.

cæspitosus erectus gracilis glaber 60 cm. altus. Folia radicalia minora caulina majora, folii caulini inferioris lamina linearis 17 cm. longa $2\frac{1}{2}$ mm. lata apice acuminata basi haud contracta subtus glabra supra minute hirsuta, ligula membranacea hyalina $2\frac{1}{2}$ mm. lata 3 mm. longa, vagina 8 cm. longa. Panicula terminalis laxè spiculifera cylindrico-pyramidalis 15–20 cm. longa 8 cm. lata, ramis primariis superioribus 2–3-fasciculatis, inferioribus 8–9-fasciculatis, fasciculis alternis a se 2–5 cm. remotis; rachis paniculæ gracilis erecta recta plus minus scabra; ramis primariis rectis ascendento-patentibus gracilibus plus minus hirsuto-scabris, ramulis secundariis rectis vel crispatis. Gl. I. ovato-lanceolata $2\frac{1}{2}$ mm. longa 1 mm. lata apice obtuse acuminata basi plus minus contracta glabra dorso 1-nervata 1-costata ad costam hirsuto-scabra; gl. II. conformis; gluma florens oblonga $1\frac{1}{2}$ mm. longa 1 mm. lata subconvuluto-concava apice truncata denticulata 3–5-nervia glabra dorso medio arista hirsuta scabra instructa, glabra vel ad basin hirsuta; rhachilla supra glumas I. et II. brevissima haud producta hirsuta; palea 0. Stamina 3, antheris linearibus.

A. alba HAYATA Fl. Mont. Formos. (non LINN.).

HAB. Randaizan (No. 7062); in montibus centralibus, leg. U. MORI et S. KOTO.

Near *A. canina*, but differs from it in having much shorter awns of the glume III.

3. ***Agrostis sozanensis*** HAYATA sp. nov. (Fig. 52). Culmus cæspitosus 50–60 cm. longus glaber. Folia radicalia non visa; caulina: lamina linearis 9–10 cm. longa 3 mm. lata apice acuminata supra scabra basi haud vel vix contracta, ligula 3 mm. longa totiusque lata apice truncata, vagina 3–5 cm. longa. Panicula 13 cm. longa 5–6 cm. lata, ramis primariis inferioribus 4–5 fasciculatis rectis gracilibus ascendentibus, fasciculis alternis a se

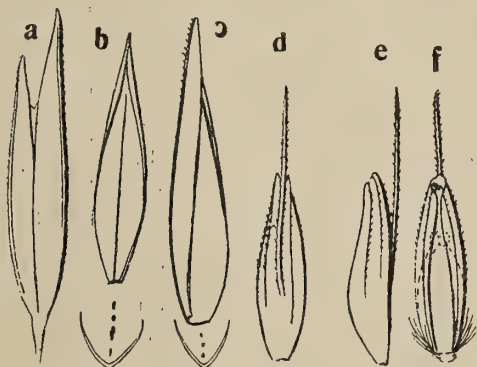


Fig. 51, *Agrostis transmorrisonensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, the same, seen from side; f, the same glume, seen from front.

2-3 cm. remotis, ramulis secundariis rectis vel plus minus crispatis scabris. Gl. I. oblonga 2 mm. longa $\frac{2}{3}$ mm. lata apice acuminata basi contracta dorso scabra. Gl. II. conformis paulo minor. Gl. florens oblonga apice obtusa

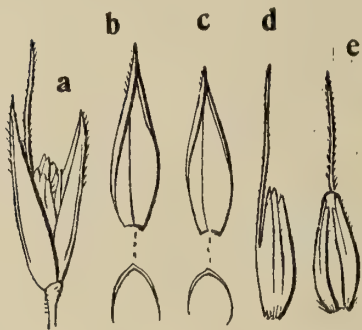


Fig. 52, *Agrostis sozanensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume; e, the same, seen from front.

5-nervia semi-hyalina basi breve hirsuta dorso medio arista scabra $1\frac{1}{2}$ mm. longa instructa. Palea O.

HAB. Sōzan, Taihoku.

Near *A. perennans* TUCK, but differs from it in having awned glumes III.

4. ***Agrostis morrisonensis* HAYATA** sp. nov. (Fig. 53). Culmus cæspitosus erectus rectus 20-45 cm. longus glaber laevis. Folia basi et inferiore caulis disposita, lamina convoluta-filiformi 8-10 cm. longa explicato $\frac{4}{5}$ mm.

lata basi haud contracta supra (intus) minute hirsuta subtus (extus) glabra; ligula oblongo-triangularis 1 mm. longa totiusque lata apice truncata, vagina 2-5 cm. longa. Panicula 5-10 cm. longa laevis, ramis primariis fasciculatis rectis ascendentibus vel patentibus, fasciculis alternis, ramulis secundariis plus minus crispatis vel rectis; gl. I. oblonga 2 mm. longa $\frac{2}{3}$ mm. lata apice obtusa 1-nervia dorso carinata ad carinas scaberrima; gl. II. conformis; gluma florens oblonga $1\frac{1}{2}$ mm. longa glabra 5-nervia convoluta apice truncata dentata hyalina haud aristata.

Agrostis Clarkei HAYATA Fl. Mont. Formos. p. 237 (non Hook. f.).

HAB. in Monte Morrison, ad 12000 ped. alt.

Near *A. flaccida*, but differs from it in having awnless glume III. Also differs from *A. Clarkei* Hook. f. in having nearly equal I. and II. glumes.

5. ***Agrostis perennans* TUCK.**; HAYATA Gen. Ind. Fl. Formos. p. 93

A. canina L. var. *formosana* HACK.; MATSUM. et HAYATA l.c. p. 535.

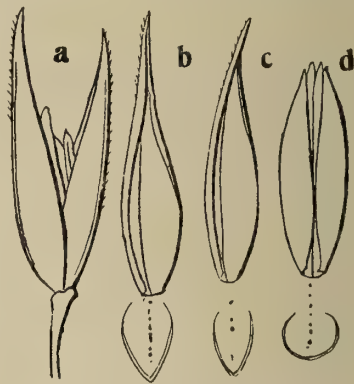


Fig. 53, *Agrostis morrisonensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume.

LI. *Muehlenbergia* SCHREB.

***Muehlenbergia arisanensis* HAYATA** sp. nov. (Fig. 54). Caulis 60–90 cm. longus gracillimus rectus erectus basi paucis repens, internodiis inferioribus 5 cm. longis teretibus glabris lævibus, ad nodos radicans a basi usque ad medium remote foliatus sursum haud foliatus. Folia mediana linearia a se 5

cm. distantia circ. 10 cm. longa 4 mm. lata apice acuminata basi contracta ad basin hirsuta cæterem glabra utraque pagine margineque scaberrima, ligula $\frac{1}{2}$ mm. longa 2 mm. lata hyalina apice truncata hirsuto-ciliata, vagina 6 cm. longa haud hirsuta plus minus scabra. Panícula cylindrica 18 cm. longa, ramis primariis scabris alternis 2–3-fasciculatis ascendentibus ad rhachin paniculæ fere contactis 2–3 cm. longis, fasciculis 1–2 cm. remotis. Spiculæ generaliter sed haud semper geminatim secus rhachin ramulorum panicularum dispositæ, alia longiore alia breviora pedicellata, pedicellis brevioribus $\frac{1}{3}$ mm. longis, longioribus 1 mm. longis scabris; gluma I. ovata semi-hyalina $\frac{1}{2}$ – $\frac{1}{3}$ mm. longa apice obtusa glabra; gluma II. semihyalina oblonga $1\frac{2}{3}$ mm. longa obtusa cum gl. I. persistens; gluma III. lanceolata 2 mm. longa $\frac{2}{3}$ mm. lata apice acuminata 2-dentata, inter dentes arista 8 mm. longa scabra instructa dorso 3-costata purpurea ad costas scabra basi hirsuta; gluma IV. lanceolata apice acuminata 2 mm. longa purpurea basi hirsuta 2-costata, ad costas scabrida, basi dorso hirsuta; palea O. Anthera ellipsoidea.



Fig. 54, *Muehlenbergia arisanensis* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, gl. III.; e, f, g, glume IV., seen from different sides; h, i, a stamen, seen from different sides; j, a caryopsis.

Caryopsis ellipsoidea $1\frac{1}{3}$ mm. longa $\frac{1}{3}$ mm. lata longitudinaliter rugulosa.

HAB. in monte Arisan, ad 2500 m. alt., leg. U. FAURIE, Dec. 1914.

Near *M. japonica* STEUD., but differs from it in having far much smaller I. and II. glumes.

LII. *Calamagrostis* ADANS.

1. Branches of panicles much contracted, spikelets much narrower, densely clustered..... 1. *C. Epigejos* var. *densiflora*.
Branches of panicles not contracted, spikelets not clustered, densely or very laxely arranged. 2
2. Branches or branchlets of panicles straight, spikelets densely arranged. 2. *C. formosana*.
Branches or branchlets of panicles flexuous, spikelets few, loosely arranged. 3. *C. morrisonensis*.

1. **Calamagrostis Epigejos** ROTH. var. **densiflora** LEDEB.; MATSUM. et HAYATA l.c. p. 536.

2. **Calamagrostis formosana** HAYATA sp. nov. (Fig. 55). Culmus 70–80 cm. altus glaber et lævis erectus rectus teres. Folia radicularia non visa; caulina: lamina linearis 30–40 cm.

longa 6–7 mm. lata apice acuminata basi vix attenuata plus minus scabra, vagina 14 cm. longa caulem amplexant, ligula magna 8 mm. longa 5 mm. lata membranacea. Panicula terminalis cylindrica 20 cm. longa 4 cm. lata; rhachis teres recta, ramis rectis ascendentibus primariis 5–6 fasciculatis, fasciculis alternis circ. 5 cm. longis, inferioribus a se 1–3 cm. remotis rectis, ramulis secundariis 2–3 fasciculatis, fasciculis alternis plus minus scabris, pedicellis ultimis 1–2 mm. longis scabris. Spiculæ pallido-violascentes

vel non coloratæ. Gl. I. lanceolata $4\frac{1}{2}$ mm. longa 1 mm. lata apice acuminata subglabra dorso versus apicem plus minus carinata scabra; gluma II. fere conformis; gl. florens hyalina 5-nervosa 3 mm. longa oblonga 1 mm. lata apice truncata denticulata dorso prope basin arista una instructa, arista 4 mm. longa haud torta scabra, palea hyalina lanceolata $2\frac{1}{2}$ mm. longa haud carinata; rhacheola supra glumas I. et II. brevissima longe pilosa, pilis $2\frac{1}{2}$ mm. longis patentibus. Stamina 3.

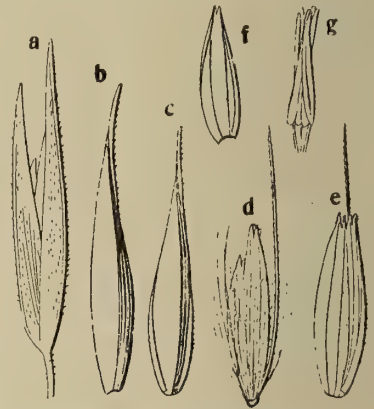


FIG. 55, *Calamagrostis formosana* HAYATA. a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, the same glume; f, a palea; g, stamens.

Calamagrostis arundinacea HAYATA Fl. Mont. Formos. p. 237 (non ROTH.).

HAB. Hakkutaisan, leg. U. MORI, Sept. 1910, (typus); Arisan, ad 2500 m. alt., leg. U. FAURIE; Mt. Morrison, leg. U. MORI.

Near *C. arundinacea*, ROTH.; but differs from it in the hairs on the callus of the glume III. which hairs are in this new species longer than or equal to the glume itself; but in *C. arundinacea* they are much shorter than the gl. III.

3. ***Calamagrostis morrisonensis*** HAYATA sp. nov. (Fig. 56). Culmus 50–60 cm. altus glaber teres gracilis erectus. Folia ad partem inferiorem caulis disposita radicalia non visa; caulina: lamina linearis 15–20 cm. longa 3–4 mm. lata acuminata basi auriculata subtus glabra supra minute hirsuta, ligula membranacea $\frac{1}{2}$ mm. longa 2 mm. lata margine integra, vagina 2–3 cm. longa. Panícula terminalis gracilis 8–10 cm. longa 3–4 cm. lata, ramis primariis 2–3-fasciculatis, fasciculis alternis a se 1–2 cm. remotis, ramis et ramulis crispatis plus minus scabris. Gluma I. lanceolata 4 mm. longa 1 mm. lata apice acuminata dorso sursum 1-carinata ad carinas scabra. Gluma II. conformis 3-nervia subglabra. Rhachilla supra glumas I. et II. longe hirsuta, pilis 2–3 mm. longis. Gluma florens oblongo-lanceolata apice truncata ad summum denticulata basi plus minus contracta subglabra prope basin arista 4 mm. longa instructa, aristis scabris. Palea oblongolanceolata $2\frac{1}{2}$ mm. longa apice obtusa.

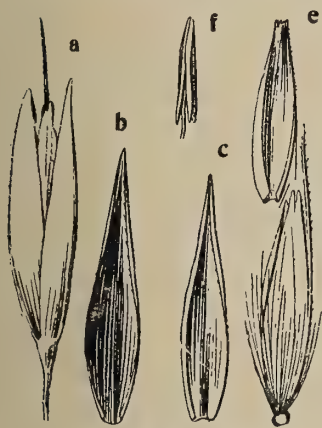


Fig. 56, *Calamagrostis morrisonensis* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, a palea; f, a stamen.

C. arundinacea ROTH. var *nipponica* HAYATA (non HACK.) Fl. Mont. Formos. p. 237.

C. formosana HAYATA var. *pauciflora* HAYATA Gen. Ind. Fl. Formos. p. 95.

HAB. in monte Morrison, ad 13000 ped. alt., typus!

Near *Calamagrostis formosana* HAYATA, but differs from it in the much smaller form with much looser panicles and curled branches, and in the leaves with auricled base, much shorter ligules and the hairy upper surface.

LIII. *Aira* LINN.

Aira Kawakamii HAYATA in Bot. Mag. (Tōkyō) XX. p. 47.

LIV. *Deschampsia* BEAUV.

Deschampsia cæspitosa BEAUV.; HAYATA Fl. Mont. Formos. p. 238.

Deschampsia flexuosa TRIN.; HAYATA Fl. Mont. Formos. p. 238.

LV. *Avena* LINN.

Avena fatua LINN.; FORBES et HEMSL. Ind. Fl. Sin. III. p. 401.

HAB. Akō, leg. MATSUDA, Aprili. 1915.

LVI. *Trisetum* PERS.

Trisetum subspicatum BEAUV.; HAYATA Fl. Mont. Formos. p. 238.

LVII. *Enteropogon* NEES.

Enteropogon gracilior RENDLE in HEMSL. Ind. Fl. Sin. III. p. 403;
MATSUM. et HAYATA Enum. Pl. Formos. p. 537.

HAB. Takao, leg. T. SOMA, Dec. 1911.

LVIII. *Tripogon* ROTH.

Tripogon chinensis HACK.; MATSUM. et HAYATA l.c. p. 540.

LIX. *Cynodon* PERS.

Cynodon Dactylon PERS.; MATSUM. et HAYATA l.c. p. 536.

LX. *Chloris* SWARTZ.*Key to species.*

1. Spikes 5-6 cm. long 3 mm. broad. *C. barbata*.
Spikes much slenderer, 10-15 cm. long, 2 mm. broad.... *C. incompleta*.
Chloris barbata SWARTZ.; MATSUM. et HAYATA l.c. p. 537.
Chloris incompleta ROTH.; MATSUM. et HAYATA l.c. p. 538.

LXI. *Eleusine* GÆRTN.*Key to species.*

- Leaves broad. 1. *E. coracana*.
Leaves narrow..... 2. *E. indica*.
1. **Eleusine coracana** GÆRTN.; MATSUM. et HAYATA l.c. p. 538.
2. **Eleusine indica** GÆRTN.; MATSUM. et HAYATA l.c. p. 538.

LXII. *Dactyloctenium* WILLD.

Dactyloctenium ægyptiacum WILLD.; MATSUM. et HAYATA l.c. p. 537.

LXIII. *Leptochloa* BEAUV.**Leptochloa chinensis** NEES., MATSUM. et HAYATA. l.c. p. 539.LXIV. *Arundo* LINN.*Key to species.*

Leaves broader, glumes I. and II. nearly 1 cm. long, tall grass.

..... 1. *A. Donax* var. *colectricha*.

Leaves narrower, glumes I. and II. 3-4 mm. long; smaller grass.

..... 2. *A. formosana*.1. **Arundo Donax** LINN. var. **colectricha** HACK.; MATSUM. et HAYATA l.c. p. 540.2. **Arundo formosana** HACK.; MATSUM. et HAYATA l.c. p. 540.*A. formosana* HACK. var. *gracilis* HACK.LXV. *Phragmites* TRIN.*Key to species.*Panicle and glumes not spreading much..... 1. *P. communis*.Panicle and glumes spreading much 2. *P. Karka*.1. **Phragmites communis** TRIN.; MATSUM. et HAYATA l.c. p. 541.2. **Phragmites Karka** TRIN. MATSUM. et HAYATA l.c. p. 541.LXVI. *Eragrostis* BEAUV.*Key to species.*

1. Spikelets not exceeding 2 mm. in length, axis of spikelets articulate. 2

Spikelets more than 2 mm. in length, axis of spikelets not articulate ... 3

2. Palea not ciliate at the margin..... 1. *E. interrupta* var. *tenuissima*.Palea long ciliate at the margin 2. *E. tenella*.3. Mature spikelets not exceeding $1\frac{1}{2}$ mm. in breadth..... 4Mature spikelets more than $1\frac{1}{2}$ mm. in breadth 54. Glumes narrower and acute at the apex 3. *E. pilosa*.Glumes broader and obtuse or rounded at the apex 4. *E. minor*.5. Panicles cylindrical..... 5. *E. geniculata*.

Panicles more or less diffuse 6

6. Spikelets nearly 3 mm. in breadth..... 7

Spikelets less than 3 mm. broad..... 8

7. Spikelets usually purple toward the tip 6. *E. elongata*.

- Spikelets gray or dark-colored, palea shortly hairy at the margin, but not ciliate, glume I. quite obtuse but not apiculate at the apex, leaves quite or nearly glabrous 7. *E. atrovirens*. (= *E. bulbillifera*.)
8. Spikelets smaller very brown, glume I nearly rounded very obtuse.....
..... 8. *E. Makinoi*.
Spikelets larger, gray or slightly brown, glume I. oblong less obtuse... 9
9. Spikelets slightly brown, palea distinctly ciliate, caryopsis rounded.
..... 9. *E. major*.
Spikelets slightly purple, palea less ciliate, caryopsis elliptical.....
..... 10. *E. amabilis* = *E. unioloides* = *E. formosana*.
1. **Eragrostis interrupta** BEAUV. var. **tenuissima** STAPP., MATSUM.
et HAYATA l.c. p. 543.
E. japonica TRIN.
2. **Eragrostis tenella** ROEM.; HAYATA Gen. Ind. Fl. Formos. p. 96.
E. plumosa LINK.; MATSUM. et HAYATA l.c. p. 545.
3. **Eragrostis pilosa** BEAUV.; l.c. p. 544.
4. **Eragrostis minor** HOST. l.c. p. 544.
5. **Eragrostis geniculata** NEES et MEY; l.c. p. 543.
6. **Eragrostis elongata** JACQ. l.c. p. 542.
7. **Eragrostis atrovirens** TRIN.; HAYATA Gen. Ind. Fl. Formos. p. 96.
E. bulbillifera STEUD.; MATSUM. et HAYATA l.c. p. 542.
8. **Eragrostis Makinoi** HACK.; MATSUM. et HAYATA l.c. p. 544.
9. **Eragrostis major** HOST.; MATSUM. et HAYATA l.c. p. 543.
10. **Eragrostis amabilis** WRIGHT et ARN.; HAYATA Gen. Ind. Fl. Formos. p. 96.
E. formosana HAYATA Mater. Fl. Formos. p. 408.
E. unioloides NEES.; MATSUM. et HAYATA l.c. p. 545.

LXVII. *Diplachne* BEAUV.

Diplachne fusca BEAUV.; MATSUM. et HAYATA l.c. p. 438.

LXVIII. *Lophatherum* BRONGN.

Lophatherum gracile BRONGN.; MATSUM. et HAYATA l.c. p. 546.

LXIX. *Centotheca* DESV.*Key to species.*

Flowering glumes with reflexed submarginal bristles ... 1. *C. lappacea*.

Flowering glumes with no bristle 2. *C. lappacea* var. *inermis*.

1. ***Centotheca lappacea*** DESV.; MATSUM. et HAYATA l.c. p. 546.

2. ***Centotheca lappacea*** DESV. var. ***inermis*** RENDL.; MATSUM. et HAYATA l.c. p. 546.

LXX. *Poa* LINN.

Poa annua LINN.; MATSUM. et HAYATA l.c. p. 547.

Poa palustris LINN. l.c. p. 547.

Poa spp.

LXXI. *Festuca* LINN.

Festuca ovina LINN. var. ***vulgaris*** KOCH.; HAYATA Fl. Mont. Formos. p. 240.

LXXII. *Brachypodium* BEAUV.*Key to species.*

Spikelets mostly quasiterminal solitary..... 1. *B. Kawakamii*.

Spikelets spicate 2. *B. formosanum*.

1. ***Brachypodium Kawakamii*** HAYATA Fl. Mont. Formos. p. 237, t. 40.

2. ***Brachypodium formosanum*** HAYATA sp. nov. (Fig. 57) Perennis. Culmus gracillimus 50–80 cm. altus erectus plus minus curvatus basi plus minus repens, internodiis 4 cm. longis, glaber lævis. Folia versus basin caulis disposita linearia 15 cm. longa 7 mm. lata apice acuminata utraque glabra lævia, nervis primariis utroque latere costæ 4, venulis secundariis inter nervos primarios 5, haud tessellata, vaginis 5–6 cm. longis culmum amplectantibus tubuliformibus, ligulis membranaceis hirsutis 2 mm. longis $3\frac{1}{2}$ mm. latis. Spiculæ versus apicem caulis spicatim alternatim remoteque dispositæ sessiles, rhachis semi-teres ad nodos tenuiter hirsuta; spiculæ lineari-lanceolatae 2–2 $\frac{1}{2}$ cm. longæ 3–4 mm. latæ 5–7-floratae latere complanatae. Gl. I. minuta triangulari-lanceolata 2 mm. longa acuta vel obtusa 3-nervata, nervis dorso elevatis, vacua; gl. II. vacua triangulari-lanceolata 5 mm. longa apice acuminata 5–7-nervata glabra. Glumæ florentes 5–7, inferior lanceolata

1 cm. longa $2\frac{1}{2}$ –3 mm. lata apice acuminata basi obtusa callo annulari instructa 7-nervia extus rugosa intus lævis apice ad aristam 8 mm. longam scabram abeuns. Palea quam gluma florens paucè brevior 8 mm. longa, inter carinas $1\frac{1}{2}$ mm. lata apice truncata basi obtusa 2-carinata ad carinas ciliata secus carinas interiore plicata. Caryopsis linearis 4–5 mm. longa 1 mm. lata apice villosa.

Brachypodium sylvaticum HAYATA
Fl. Mont. Formos. p. 240 (non ROEM.
et SCHUTT.)

HAB. in monte centrali, Hakkutaisan, typus; Mt. Morrison, 12000 ped alt.; inter Ushōkō et Arisan.

Near *B. sylvaticum* ROEM. et SCHUTT., but distinguishable from it in having much narrower leaves and not ciliolate rhachilla of the spikelets.

LXXIII. *Lepturus* R. BR.

Lepturus repens R. BR.; MATSUM.
et HAYATA l.c. p. 548.

LXXIV. *Triticum* LINN.

Triticum vulgare VILL.; MATSUM.
et HAYATA, l.c. p. 548.

LXXV. *Arundinaria* MICHX.

Arundinaria Kunishii HAYATA
Ic. Pl. Formos. VI. p. 136.

Arundinaria naibunensis HAYATA
Mater. Fl. Formos. p. 408.

Arundinaria niitakayamensis
HAYATA in Tokyo Bot. Mag. XXI. p. 49.

Arundinaria oiwakensis HAYATA Ic. Pl. Formos. VI. p. 137.

Arundinaria Usawai HAYATA Ic. Pl. Formos. VI. p. 138.

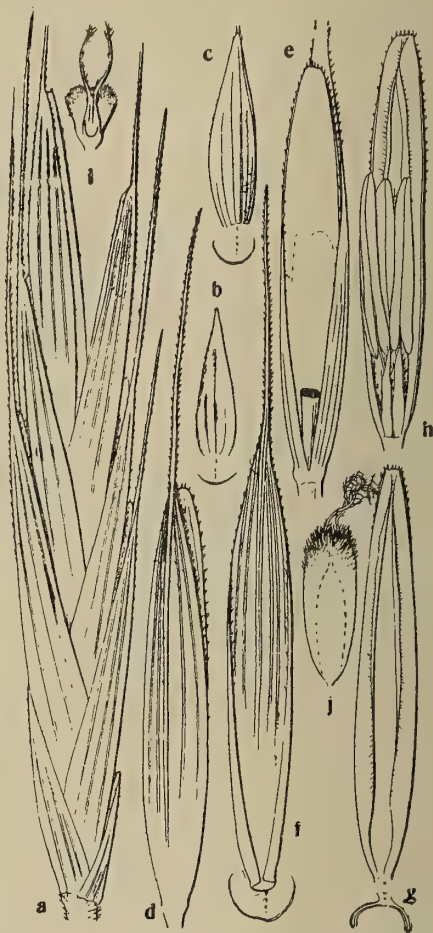


Fig. 57. *Brachypodium formosanum* HAYATA; a, a spikelet; b, gl. I.; c, gl. II.; d, a flowering glume with its palea; e, the same, seen from a different side; f, the same glume; g, the same palea; h, the same palea with stamens; i, ovary; j, a young caryopsis.

LXXVI. *Phyllostachys* SIEB. et ZUCC.**Phyllostachys formosana** HAYATA Ic. Pl. Formos. VI. p. 140.**Phyllostachys lithophila** HAYATA Ic. Pl. Formos. VI. p. 141.**Phyllostachys Makinoi** HAYATA Ic. Pl. Formos. V. p. 250.**Phyllostachys nigripes** HAYATA Ic. Pl. Formos. VI. p. 142.**Phyllostachys pubescens** H. LEH.; HAYATA Ic. Pl. Formos. VI. p.

140.

*P. edulis.*LXXVII. *Bambusa* SCHREM.**Bambusa breviflora** MUNRO; HAYATA Ic. Pl. Formos. VI. p. 143.**Bambusa dolichoclada** HAYATA l.c. p. 144.**Bambusa dolichomerithallina** HAYATA l.c. p. 146.**Bambusa Fauriei** HACK. HAYATA l.c. p. 148.**Bambusa nana** ROXB.; MATSUM. et HAYATA l.c. p. 549.**Bambusa Oldhami** MUNRO; HAYATA l.c. p. 150.**Bambusa pachinensis** HAYATA l.c. p. 150.**Bambusa Shimadai** HAYATA l.c. p. 151.**Bambusa stenostachya** HACK.; HAYATA l.c. p. 152.**Bambusa tuldoidea** MUNRO; HAYATA l.c. p. 153.

The occurrence of *B. angulata* MUNRO and *B. Ridleyi* GAMBLE in the island is very doubtful.

LXXVIII. *Dendrocalamus* NEES.**Dendrocalamus latiflorus** MUNRO; MATSUM. et HAYATA l.c. p. 551.LXXIX. *Schizostachyum* NEES.

Schizostachyum acutiflorum MOORE? HAYATA in Gen. Ind. Fl. Formos. p. 99.

Polypodiaceæ.

Polystichum ROTH.

Polystichum Morii HAYATA sp. nov. (Fig. 58). Rhizoma? Stipes 6 cm. longus gracillimus basi sursum parce squamatus, squamis lanceolatis 1 mm. longis acuminatis. Frons coriacea in ambitu linearis vel lineari-lanceolata 6 cm. longa 1 cm. lata apice acuminata basi truncata pinnata, pinnis infimis maximis superioribus gradatim minoribus patentibus vel in-

ferioribus interdum reflexis, mediis rectangularibus 7 mm. longis 3 mm. latis apice obtusis valde obliquis latere inferiore angustioribus latere superiore latioribus 2 mm. latis; basi latere inferiore cuneato-acutis latere superiore basi late truncatis margine serratis, serris cuspidiformibus triangularibus aristatis validissimis; pagine utraque glabra; rhachis frondis recta supra sulcata squamis lineari-filiformibus sparce conspersa. Sporangia 3 ad paginam



Fig. 58, *Polystichum Morii* HAYATA; a, the plant; b, c, d, various scales on the stipe and frond; e, pinna; f, an indusium.

inferiorem pinnae singulæ. Indusia majora peltata 2 mm. in diametro margine denticulata. Pinnis a se 3-4 mm. remotis.

HAB. Mt. Morrison, ad 10000 ped. alt., leg. U. MORI, Dec. 1908.

Near *P. simplicipinnum* HAY.; but differs from it in having much smaller pinnae which are much shorter and more rounded than those of *P. simplicipinnum*. This is the smallest one of all the species of *Polystichum*.

Selaginellaceæ.

Selaginella SPRING.*Key to the species.*

1. Bracts of spikes uniform 2
 Bracts of spikes dimorphous..... 8
2. Stem decumbent, spikes very short..... 1. *S. kelungensis*.
 Stem ascendent or erect..... 3
3. Stem densely tufted 2. *S. involvens*.
 Stem not tufted 4
4. Leaves entire 3. *S. canaliculata*.
 Leaves more or less serrulate 5
5. Branches with leaves on both sides more than 5 mm. broad
 4. *S. atroviridis*.
 Branches or branchlets with leaves on both sides less than 3 mm.
 broad..... 6
6. Macrospores winged..... 5. *S. caulescens*.
 Macrospores wingless..... 7
7. Leaves membranaceous
 6. *S. subcaulescens*.
 Leaves thicker. 7. *S. pseudo-involvens*.
8. Branches or branchlets with leaves on both
 sides nearly 7 mm. broad, 8. *S. Somai*.
 Branches or branchlets with leaves on both
 sides less than 4 mm. broad..... 9
9. Ventral leaves narrowly ovate
 9. *S. morrisonensis*.
 Ventral leaves broadly ovate. 10
10. Spikes wider, 10. *S. leptophylla*.
 Spikes narrower. ... 11. *S. stenostachya*.



Fig. 59, *Selaginella kelungensis* HAYATA; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf.

1. ***Selaginella kelungensis*** HAYATA
 sp. nov. (Fig. 59). Caulis decumbens ad totam longitudinem radicibus
 instructus ramosus toto foliatus 10-30 cm. longus. Folia dimorpha

membranacea remota; folia dorsalia minora oblique cuspidato-ovata 2 mm. longa 1 mm. lata apice acuminata haud aristata plus minus recurva basi obliqua latere exteriore auriculata latere interiore haud vel leviter auriculata margine minute serrulata ad caulem adpresse disposita ascendentia; folia ventralia majora oblique ovata $2\frac{1}{2}$ mm. longa $1\frac{1}{2}$ mm. lata apice obtuse acuta basi oblique rotundata margine minute serrulata vel subintegra. Spicæ brevissimæ 3 mm. longæ, bracteis uniformibus; bracteis lanceolato-ovatis 2 mm. longis acuminatis basi rotundatis margine minute serrulatis. Macrosporangium infimum; macrosporis subglobosis $\frac{1}{2}$ mm. in diametro elevato-reticulatis; microsporangia superiora ellipsoidea $\frac{2}{3}$ mm. longa $\frac{1}{3}$ mm. lata apice rotundata basi leviter 2-lobata.

HAB. Monte centrali, leg. U. MORI

Dec. 1908; Shichiseitonzan, leg.

Y. SHIMADA; Kelung, leg. T. SOMA;

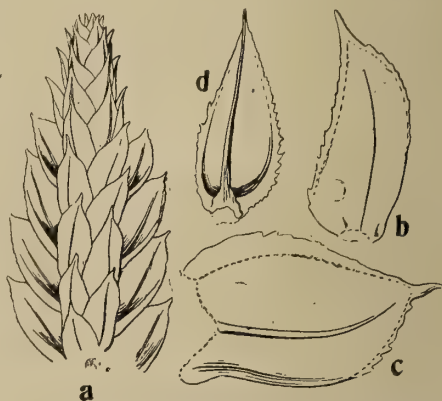


Fig. 60, *Selaginella involvens* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Chikushiko, leg. S. NAGASAWA.

Near *Selaginella concinna* SPR., but differs from it in having much acuter leaves and bracts.

2. ***Selaginella involvens*** SPRING. (Fig. 60); BAKER Fern All. p. 87; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. Kusshaku-Urai, Maruyama.

3. ***Selaginella canaliculata*** BAKER (Fig. 61); Fern All. p. 91; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

HAB. Ōchobi; Bonbonzan; Kappanzan; Hii-ranzan; Pachina; Kusshaku; Kōtōshō; Kelung; Karapin.

Widely spread over all the island. Same as the Hongkong form.

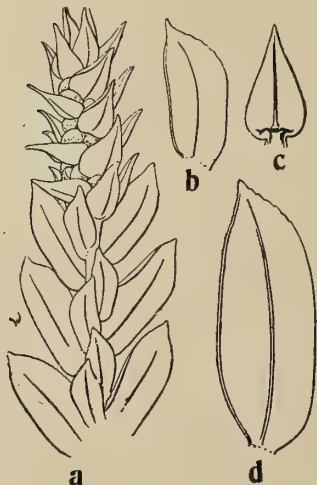


Fig. 61, *Selaginella canaliculata* BAKER; a, apical portion of a branch with a spike; b, a dorsal leaf; c, a bract; d, a ventral leaf.

4. **Selaginella atroviridis** SPRING (Fig. 62); BAKER Fer. All. p. 77; MATSUM. et HAYATA Enum. Pl. Formos. p. 552.

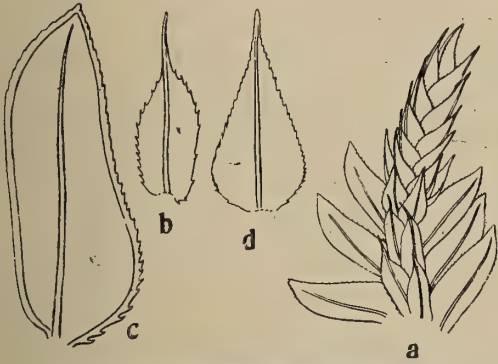


Fig. 62, *Selaginella atroviridis* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Enum. Pl. Formos. p. 552.

HAB. Suichōryu.

6. **Selaginella subcaulescens** HAYATA sp. nov. (Fig. 64). Planta 20–40 cm. longa. Caulis ascendento-erectus medio sursum ramosus a basi usque ad supra medium eramosus teres pallido-stramineus squamis adpressis instructus, squamis lanceolato-triangularibus $2\frac{1}{2}$ mm. longis 1 mm. latis apice cuspidato-acuminatis; partibus caulis ramosis in ambitu ovato-lanceolatis 10–20 cm. longis, ramis juxta infimos longissimis ramosissimis; ramulis cum foliis 2– $2\frac{1}{2}$ mm. latis. Folia dimorpha dorsi-ventraliter disposita; folia dorsalia minora oblique cuspidato-ovata ascendentia cum cuspidibus 1 mm. longa $\frac{1}{2}$ mm. lata apice cuspidata, cuspidibus $\frac{1}{3}$ mm. longis, basi oblique cordata vel haud cordata margine aristato-serrulata; folia ventralia majora patentia contigua oblique oblongo-ovata $1\frac{1}{2}$ mm. longa $\frac{2}{3}$ mm. lata versus apicem superiore falcata margine subintegra sed latere superiore versus basin minute serrulata. Spicæ $\frac{1}{2}$ –1 cm. longæ tetragonæ plus minus complanatæ cum bracteis 2 mm. latæ; bracteis uniformibus cuspidato-ovatis $1\frac{1}{4}$ mm. longis $\frac{2}{3}$ mm. latis apice cuspidatis valde costatis margine serrulatis;

HAB. Taitonzan; Suiteiryō; Kokei; Shintengai.

I have seen a specimen of this species from Hongkong. It is a little different from our plant in the leaves which are in the Hongkong specimen more or less muricate on the upper surface.

5. **Selaginella caulescens** SPRING (Fig. 63); BAKER Fern. All. p. 94; MATSUM. et HAYATA

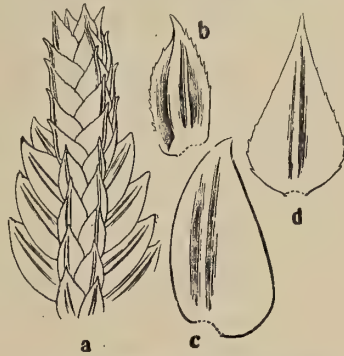


Fig. 63, *Selaginella caulescens* SPRING; a, apical portion of a branch; b, a dorsal leaf; c, a ventral leaf; d, a bract.



Fig. 64, *Selaginella sub-caulescens* HAYATA; a, a portion of a branch with a spike; b, a ventral leaf; c, a dorsal leaf; d, a bract.

conspersis instructus, squamis lanceolato-triangularibus 2 mm. longis acutis basi peltatis et fimbriatis approximatis fere imbricatis; partibus caulis ramosis triangularibus vel pentagonis 6–8 cm. in diametro, ramis (pinnis) patentibus vel ascendentibus angulo 45° a cauli egressis; ramulis vel pinnulis cum foliis $1\frac{1}{2}$ –2 mm. latis. Folia dimorpha dorsi-ventraliter disposita; folia dorsalia minora crassiuscula oblique lanceolata cum cuspidibus $1\frac{1}{4}$ mm. longa $\frac{1}{4}$ mm. lata apice acuminata aristata, aristis $\frac{1}{4}$ mm. longis, basi subtruncata margine integra; folia ventralia majora oblique ovata $1\frac{2}{3}$ mm. longa $\frac{3}{4}$ mm. lata apice cuspidato-aristata, aristis $\frac{1}{2}$ mm. longis, latere interiore crassiuscula integra latere superiore membranacea serrulata basi plus minus contracta. Spicæ ad apicem ramulorum terminales erectæ rectæ $1\frac{1}{2}$ –2 cm. longæ tetragonæ plus minus complanatæ $1\frac{1}{2}$ –2 mm. latæ, bracteis uniformibus ovatis cuspidato-aristatis $2\frac{1}{2}$ cm. longis $1\frac{1}{4}$ mm. latis versus costam incrassatis ad marginem imbricatis margine denticulatis basi contractis leviter peltatis.

HAB. inter Busegan et Seisui, leg. S. SASAKI et B. HAYATA, Mai. 1917.

macrosporis haud alatis impresso-reticulatis.

HAB. Kussaku, Shintengai; Kōshūn, Tamsui Agiyoku, Kelung, Matō, Kyūkyokudō.

Very near *S. caulescens*, but distinguishable from it by the much thinner leaves and wingless macrospores.

7. *Selaginella pseudo-involvens* HAYATA sp. nov. (Fig. 65). Planta erecta 15–20 cm. alta ad saxum crescens solitaria vel 2–3 aggregata. Caulis ascendent-erectus usque ad supra medium eramosus teres stramineo-rubescens minus quam 1 mm. in diametro squamis adpressis

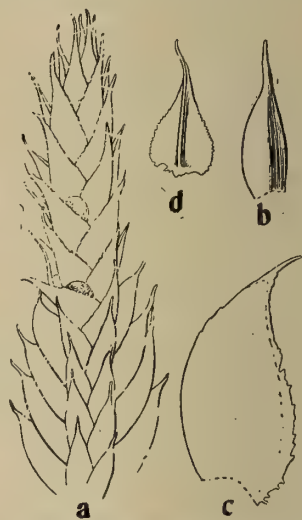


Fig. 65, *Selaginella pseudo-involvens* HAYATA; a, a portion of a branch with a spike; b, a dorsal leaf; c, a ventral leaf; d, a bract.

Closely resembles in its appearance *Selaginella involvens*; but widely different from it in its solitary stems with much more cuspidate leaves.

8. ***Selaginella Somai* HAYATA** sp. nov. (Fig. 66). Planta decumbens

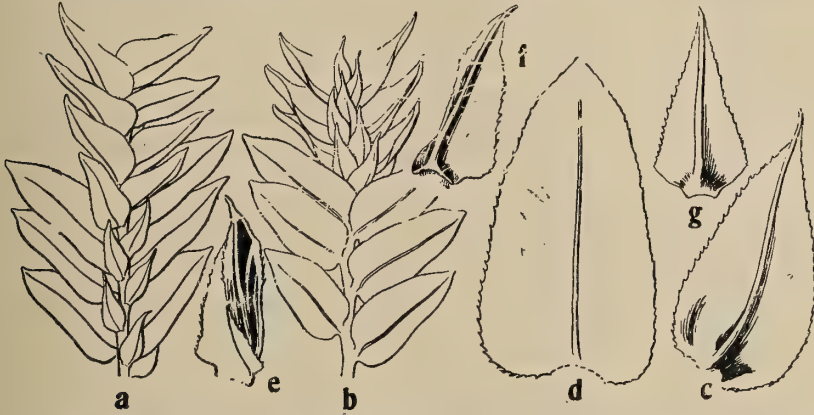


Fig. 66, *Selaginella Somai* HAYATA; a, apical portion of a branch; b, the same, seen from different side; c, a dorsal leaf; d, a ventral leaf; e, f, dorsal leaves of a spike; g, a ventral leaf of a spike.

secus totam longitudinem radicans ramosa. Caulis toto foliatus. Folia dimorpha: dorsalia minora adpresse disposita ascendentia oblique oblongo-ovata 2 mm. longa minus quam 1 mm. lata apice cuspidata basi oblique leviter cordata margine serrulata. Folia ventralia majora patentia oblique ovato-oblonga 3 mm. longa apice acuta basi rotundata obliqua margine serrulata. Spicæ complanatæ resupinatæ 7 mm. longæ 3 mm. latæ; bracteis dimorphis; ventralibus minoribus cuspidato-rhomboidalibus 2 mm. longis 1 mm. latis apice acuminatis basi triangulari obtusis margine serrulatis; dorsalibus majoribus cuspidatis triangularibus 2 mm. longis 1 mm. latis apice acutis basi rotundatis serrulatis oblique costatis, ad costas alatis, alis $\frac{1}{4}$ mm. longis.

HAB. Kujukusu et Maruyama, leg. T. SōMA, 1910.

Near *S. proniflora*, but differs from it in having contiguous leaves and less ciliolate bracts.



Fig. 67, *Selaginella morisonensis* HAYATA; a, a portion of a branch; b, a dorsal leaf; c, a ventral leaf.

9. **Selaginella morrisonensis** HAYATA (Fig. 67). Materials for a Flora of Formosa p. 410.

HAB. Ganzan, ad 9141 pd. alt.

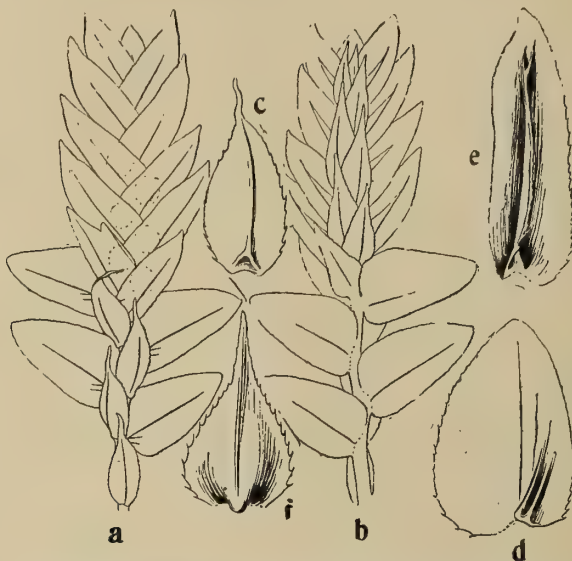


Fig. 68, *Selaginella leptophylla* BAKER; a, a branch with a spike; b, the same, seen from ventral side; c, a dorsal leaf; d, a ventral leaf; e, a dorsal leaf of a spike; f, a ventral leaf of the same spike.

10. **Selaginella leptophylla** BAKER

(Fig. 68). Fern. All. p. 109; MATSUM. et HAYATA Enum. Pl. Formos. p. 553.

HAB. Kelung, Sōzan, Kizan.



Fig. 69, *Selaginella stenostachya* HAYATA; a, a branch with spikes; b, a dorsal leaf; c, a ventral leaf; d, a ventral leaf of a spike; e, f, dorsal leaves of a spike.

11. **Selaginella stenostachya** HAYATA

(Fig. 69). Ic. Pl. Formos. IV. p. 130.

HAB. Shinkō, Sōseikyaku, Kwarenkō.

INDEX.

*Orders in capital; genera in Condensed; species in romans; synonyms and
species incidentally mentioned in italics*

Abelia R. BR.	31	Arundo LINN.	91
" <i>ionandra</i> HAYATA.	31	" <i>Donax</i> LINN. var. <i>coleotricha</i>	
Agrostis LINN.	83	HACK.	91
" <i>canina</i> L. var. <i>formosana</i> HACK.;	86	" <i>formosana</i> HACK.	91
" <i>morrisonensis</i> HAYATA.	86	Avena LINN.	90
" <i>perennans</i> TUCK.	86	" <i>fatua</i> LINN.	90
" <i>sozanensis</i> HAYATA.	85	Axonopus BEAUV.	66
" <i>suizanensis</i> HAYATA.	83	" <i>semialatus</i> HOOK.	67
" <i>transmorrisonensis</i> HAYATA.	84	Bambusa SCHREM.	95
Aira		" <i>breviflora</i> MUNRO.	95
" <i>Kawakamii</i> HAYATA.	90	" <i>dolichoclada</i> HAYATA.	95
Allium LINN.	42	" <i>dolichomerithallina</i> HAYATA.	95
" <i>morrisonense</i> HAYATA.	42	" <i>Fauriei</i> HACK.	95
Alopecurus LINN.	82	" <i>nana</i> ROXB.	95
" <i>Agrostis</i> LINN.	82	" <i>Oldhami</i> MUNRO.	95
" <i>aequalis</i> SOBOL.	82	" <i>pachinensis</i> HAYATA.	95
Andropogon LINN.	99	" <i>Shimadai</i> HAYATA.	95
" <i>aciculatus</i> RETZ.	82	" <i>stenostachya</i> HACK.	95
" <i>brevifolius</i> SWARTZ.	80	" <i>tuldoides</i> MUNRO.	95
" <i>contortus</i> LINN.	82	BERBERIDEÆ	1
" <i>formosanus</i> RENDLE.	81	Brachypodium BEAUV.	93
" <i>intermedius</i> R. BR.	80	" <i>formosanum</i> HAYATA.	93
" <i>Ischaemum</i> LINN.	80	" <i>Kawakamii</i> HAYATA.	93
" <i>kwashotensis</i> HAYATA.	80	" <i>sylvaticum</i> HAYATA.	94
" <i>micranthus</i> KUNTH.	80	Calamagrostis ADANS.	88
" <i>Nardus</i> LINN.	82	" <i>arundinacea</i> . HAYATA	89
" <i>serratus</i> THUNB.	82	" <i>arundinacea</i> ROTH. var.	
Apluda LINN.	79	<i>nipponica</i> HAYATA.	89
" <i>mutica</i> Linn	79	" <i>Epigejos</i> ROTH. var.	
Arthraxon BEAUV.	79	<i>densiflora</i> LEDEB.	88
" <i>ciliaris</i> BEAUV. var. <i>Langs-</i>		" <i>formosana</i> HAYATA.	88
<i>dorffii</i> HACK.	79	" <i>formosana</i> HAYATA var.	
Arundinaria MICHX.	94	<i>pauciflora</i> HAYATA.	89
" <i>Kunishii</i> HAYATA.	94	" <i>morrisonensis</i> HAYATA.	89
" <i>naibunensis</i> HAYATA.	94	CAPRIFOLIACEÆ	31
" <i>niitakayamensis</i>	94	CARYOPHYLLÆ	1
" <i>oiwakensis</i> HAYATA.	94	Centotheca DESV.	93
" <i>Usawai</i> HAYATA.	94	" <i>lappacea</i> DESV.	93
Arundinella RADDI.	67	" <i>lappacea</i> DESV. var. <i>inermis</i>	
Arundinella <i>setosa</i> TRIN.	67	RENDL.	93

Chamaeraphis R. BR.	66	Eragrostis elongata JACQ.	92
" depauperata NEES.	66	" formosana HAYATA.	92
<i>Chamaebatus</i>	4	" geniculata NEES et MEY.	92
Chloris SWARTZ.	90	" interrupta BEAUV. var. tennis-	
" barbata SWARTZ.	90	sima STAFF.	92
" incompleta ROTH.	90	" japonica TRIN.	92
Chrysopogon TRIN.	82	" major HOST.	92
" aciculatus TRIN.	82	" minor HOST.	92
Coix LINN.	68	" pilosa BEAUV.	92
" Lachryma-Jobi LINN.	68	" plumosa LINK.	92
CONIFERÆ	39	" tenella ROEM.	92
CUPULIFERÆ	37	" unioides NEES.	92
Cymbopogon SPR.	82	Eremochloa S. WATS.	78
" Nardus RENDLE.	82	" ophiuroides HACK.	78
Cynodon PERS.	90	" ophiuroides HACK. var.	
" Dactylon PERS.	90	longifolia HAYATA.	78
Dactyloctenium WILLD.	90	Erianthus MICH.	77
" ægyptiacum WILLD.	90	" formosanus STAFF.	77
Dendrobium SEV.	40	" pollinioides RENDLE.	77
" erythroglossum HAYATA.	40	Eriochloa H. B. et K.	55
Dendrocalamus NEES.	95	" polystachya B. H. et K.	55
" latiflorus MUNRO.	95	" villosa KUNTH.	55
Deschampsia BEAUV.	90	Euchlæna SCHRADER.	68
" cæspitosa BEAUV.	90	" luxurians DURIËU.	68
" flexuosa TRIN.	90	EUPHORBIACEÆ	34
Digitaria RICH.	65	Euphorbia LINN.	34
" barbata WILLD.	65	" tarokoensis HAYATA.	34
" formosana RENDLE.	65	Festuca LINN.	93
" Henryi RENDLE.	65	" ovina LINN. var. vulgaris KOCH.	93
" longiflora PERS.	65	Ficus LINN.	35
" sanguinalis SCOP.	65	" kaukauensis HAYATA.	35
" violascens LINK.	65	" ochobiensis HAYATA.	36
Diospyros LINN.	33	" tannoensis HAYATA.	36
" Sasakii HAYATA.	33	Galium LINN.	32
Diplachne BEAUV.	92	" Morii HAYATA.	32
" fusca BEAUV.	92	" tarokoense HAYATA.	33
Dimeria R. BR.	68	GERANIACEÆ	4
" ornithopoda TRIN.	68	Geranium LINN.	4
EBENACEÆ	33	" uniflorum HAYATA.	4
Eleusine GÆRTN.	90	GRAMINEÆ	43
" coracana GÆRTN.	90	Heteropogon PERS.	82
" indica GÆRTN.	90	" contortus BEAUV.	82
Enteropogon NEES.	90	Ichnanthus BEAUV.	65
" gracilior RENDLE.	90	" pallens MUNRO.	65
Eragrostis BEAUV.	91	Imperata CYR.	68
" amabilis WRIGHT et ARN.	92	" arundinacea CYR.	68
" atrovirens TRIN.	92	Isachne R. BR.	55
" bulbillifera STEUD.	92	" arisanensis HAYATA.	57

Isachne australis R. BR... .. 57	Oplismenus compositus ROEM. et SCH. .. 66
" <i>Clarki</i> HAYATA. 57	" undulatifolius BEAUV. .. 66
" debilis RENDLE. 58	ORCHIDEÆ 40
" firmula BÜSE. 57	Oryza LINN. 68
" heterantha HAYATA... .. 56	" sativa LINN. 68
" monticola HACK. 58	Panicum LINN... .. 58
" <i>myosotis</i> NEES. var. <i>nudiglumis</i>	" acroanthum STEUD. 64
HACK... .. 57	" amplexicaule RUDGE. 61
" <i>pulchella</i> BENTH. 58	" barbipedum HAYATA. 62
Ischæmum LINN. 77	" <i>barbivaginale</i> HAYATA. 58
" angustifolium HACK. 78	" brevifolium LINN. 64
" aristatum LINN. var. <i>imberbe</i>	" Crus-Galli LINN. 60
HACK. 78	" decompositum R. BR. 63
" ciliare RETZ. 78	" distachyum LINN. 60
" muticum LINN. 78	" excurrens TRIN. 64
" Sieboldi MIQ. <i>formosanum</i>	" indicum LINN. 61
HACK. 78	" miliaceum LINN. 64
Juniperus LINN. 39	" montanum ROXB. 64
" <i>formosana</i> HAYATA. 39	" <i>neurodes</i> SCHULT. 64
Leersia SWARTZ. 68	" <i>parvulum</i> TRIN... .. 65
" <i>hexandra</i> SWARTZ. 68	" <i>paspaloides</i> HAYATA. 60
Leptochloa BEAUV... .. 91	" patens LINN. 64
" <i>chinensis</i> NEES. 91	" <i>plicatum</i> LAM. 64
Lepturus R. BR. 94	" proliferum LAM. 63
" <i>repens</i> R. BR... .. 94	" prostratum LAM. 60
LILIACEÆ 41	" pseudodistachyum HAYATA... 60
Liparis RICH. 40	" punctatum BURM. 59
" <i>keitaoensis</i> HAYATA. 40	" repens LINN. 63
Lophatherum BRONGN. 92	" sarmentosum ROXB. 64
" <i>gracile</i> BRONGN. 92	" <i>semi-alatum</i> KTH. 67
Mahonia NUTT... .. 1	" submontanum HAYATA... 64
" <i>tikushiensis</i> HAYATA. 1	" <i>suishaense</i> HAYATA. 62
Manisuris LINN. 79	" <i>villosum</i> LAM... .. 60
Malachobatus granularis LINN. .. 79	Paspalum LINN. 53
Miscanthus ANDERS. 69	" <i>akoensis</i> HAYATA. 53
" <i>japonicus</i> HACK... .. 69	" distichum LINN. 54
" <i>sinensis</i> ANDERS... .. 69	" distichum L. var. <i>anpinense</i>
" <i>sinensis</i> ANDERS. var. <i>for-</i>	HAYATA... .. 54
mosana HACK. 69	" <i>serobiculatum</i> LINN. 53
" <i>transmorrisonensis</i> HAYATA.	Pennisetum PERS. 67
69	" <i>japonicum</i> TRIN. 67
Muehlenbergia SCHREB. 87	" <i>japonicum</i> TRIN. var. <i>vir-</i>
" <i>arisanensis</i> HAYATA. .. 87	descens MIQ. 67
Nertera BANKS et SOL... .. 32	Perotis AIT. 68
" <i>nigricarpa</i> HAYATA... .. 32	" <i>latifolia</i> AIT. 68
Ophiurus R. RR. 79	Photinia LINDL. 30
" <i>monostachyus</i> PRESL. .. 79	" <i>daphniphylloides</i> HAYATA. .. 30
Oplismenus BEAUV... .. 66	Phragmites TRIN. 91
" <i>Burmanni</i> BEAUV. 66	

Phragmites communis TRIN.	91	Rubus LINN.	4
" Karka TRIN.	91	" aculeatiflorus HAYATA.	15
Phyllostachys SIEB. et ZUCC.	95	" adenotrichopodus HAYATA.	6
" formosana HAYATA.	95	" alceaefolius POIR. var. emigratis	
" lithophila HAYATA.	95	Focke.	10
" Makinoi HAYATA.	95	" arisanensis HAYATA.	15
" nigripes HAYATA.	95	" arisanensis HAYATA. var. hois-	
" pubescens H. LEH.	95	haensis HAYATA.	15
PITTOSPOREÆ.	1	" calycinoides HAYATA.	4
Pittosporum BANKS.	1	" conduplicatus DUTHIE.	15
" daphniphylloides HAYA-		" dolichocephalus HAYATA.	19
TA.	1	" elegans HAYATA.	18
Poa LINN.	93	" euphlebophyllus HAYATA.	19
" annua LINN.	93	" fasciculatus DUTHIE.	18
" palustris LINN.	93	" floribundo-paniculatus HAYATA.	6
Podocarpus L' HER.	39	" formosensis O. KtZ.	12
" nankoensis HAYATA.	39	" fraxinifolius HAYATA.	28
Pogonatherum BEAUV.	79	" fraxinifolius POIR.	29
" saccharoideum BEAUV.		" glanduloso-calycinus HAYATA.	18
var. monandrum HACK.	79	" glandulosopunctatus HAYATA.	26
Pollinia.	72	" Kawakamii HAYATA.	6
" arisanensis HAYATA.	74	" kotoensis HAYATA.	27
" ciliata TRIN.	76	" Lambertianus SER.	9
" formosana (HACK.) HAYATA.	75	" lasiniato-stipulatus HAYATA.	11
" geniculata HAYATA.	73	" linearifolius HAYATA.	22
" imberbis NEES. var. Willdeno-		" mingetsensis HAYATA.	15
wiana HACK.	74	" moluccanus HAYATA.	11
" monantha NEES.	76	" Mori HAYATA.	9
Polliniopsis HAYATA.	76	" nantoensis HAYATA.	9
" Somai HAYATA.	76	" parvi-aralifolius HAYATA.	24
POLYPODIACEÆ.	95	" parvifraxinifolius HAYATA.	29
Polypogon DESV.	82	" parvipungens HAYATA.	26
" Hige-gaweri STEUD.	83	" parvirosae-folius HAYATA.	26
" monspeliensis DESF.	83	" pectinellus HAYATA.	4
Polystichum ROTH.	95	" pectinellus MAXIM. var. trilobus	
" Mori HAYATA.	95	Koidz.	4
Quercus LINN.	37	" pentalobus HAYATA.	4
" Sasaki KANEHIRA.	37	" piptopetalus HAYATA.	21
" spinosa A. DAVID var. Miyabei		" randaiensis HAYATA.	12
HAYATA.	37	" rarissimus HAYATA.	25
" tarokoensis HAYATA.	38	" Rolfei VIDAL var. lanatus HAYA-	
ROSACEÆ.	4	TA.	10
Rottboellia LINN.	79	" rugosissimus HAYATA.	11
" compressa LINN. var. genuina		" Shimadai HAYATA.	9
HACK.	79	" shinkoensis HAYATA.	16
" exaltata LINN. var. appen-		" Somai HAYATA.	19
diculata HACK.	79	" sphaerocephalus HAYATA.	21
RUBIACEÆ.	32	" suishaensis HAYATA.	6
		" Swinhei HANCE.	6

Rubus <i>taitoensis</i> HAYATA.	15	Spodiopogon <i>Sibiricus</i> TRIN.	71
" <i>taiwanianus</i> MATSUM.	26	" <i>tainanensis</i> HAYATA.	71
" <i>triphyllus</i> THG.	22	" <i>Takeoi</i> HAYATA.	71
Saccharum LINN.	77	" <i>tohcensis</i> HAYATA.	69
" <i>Narenga</i> HAM.	77	Sporobolus R. BR.	83
" <i>officinarum</i> LINN.	77	" <i>diandrus</i> BEAUV.	83
" <i>spontaneum</i> LINN.	77	" <i>indicus</i> R. BR.	83
Schizostachyum NEES.	95	" <i>virginicus</i> KUNTH.	83
" <i>acutiflorum</i> MOORE?..	95	Stellaria LINN.	1
SELAGINELLACEÆ.	97	" <i>reticulivena</i> HAYATA.	1
Selaginella SPRING.	77	TERNSTROEMIACEÆ.	2
" <i>canaliculata</i> BAKER.	98	Thea LINN.	2
" <i>caulescens</i> SPRING.	99	" <i>hozanensis</i> HAYATA.	2
" <i>involvens</i> SPRING.	98	" <i>Nakaii</i> HAYATA.	3
" <i>kelungensis</i> HAYATA.	97	Themeda FORSK.	82
" <i>leptophylla</i> BAKER.	102	" <i>gigantea</i> HACK. subsp. <i>caudata</i>	
" <i>morrisonensis</i> HAYAEA.	102	HACK.	82
" <i>pseudo-involvens</i> HAYATA.	100	Thuarea PERS.	67
" <i>Somai</i> HAYATA.	101	" <i>sarmentosa</i> PERS.	68
" <i>stenostachya</i> HAYATA.	102	Thysanolaena NEES.	66
" <i>subcaulescens</i> HAYATA.	99	" <i>Agrostis</i> NEES.	66
Setaria BEAUV.	67	Trillium LINN.	41
" <i>glauca</i> BEAUV.	67	" <i>Morii</i> HAYATA.	41
" <i>italica</i> KUNTH.	67	Tripogon ROTH.	90
" <i>pachystachys</i> FRANCH. et SAV.	67	" <i>chinensis</i> HACK.	90
" <i>viridis</i> BEAUV.	67	Trisetum PERS.	90
Sorghum PERS.	81	" <i>subspicatum</i> BEAUV.	90
" <i>fulvum</i> BEAUV.	82	Triticum LINN.	94
" <i>halepense</i> PERS.	82	" <i>vulgare</i> VILL.	94
" <i>vulgare</i> PERS.	82	URTICACEÆ.	35
Sphærocaryum NEES.	58	Zea LINN.	68
" <i>elegans</i> NEES.	58	" <i>Mays</i> LINN.	68
Spinifex LINN.	66	Zizania LINN.	68
" <i>squarrosus</i> LINN.	66	" <i>aquatica</i> LINN.	68
Spodiopogon TRIN.	69	Zoysia WILL.	68
" <i>formosanus</i> RENDLE.	70	" <i>pungens</i> WILLD.	68
" <i>hogoensis</i> HAYATA.	70		
" <i>Kawakamii</i> HAYATA.	70		

ICONES PLANTARUM FORMOSANARUM.

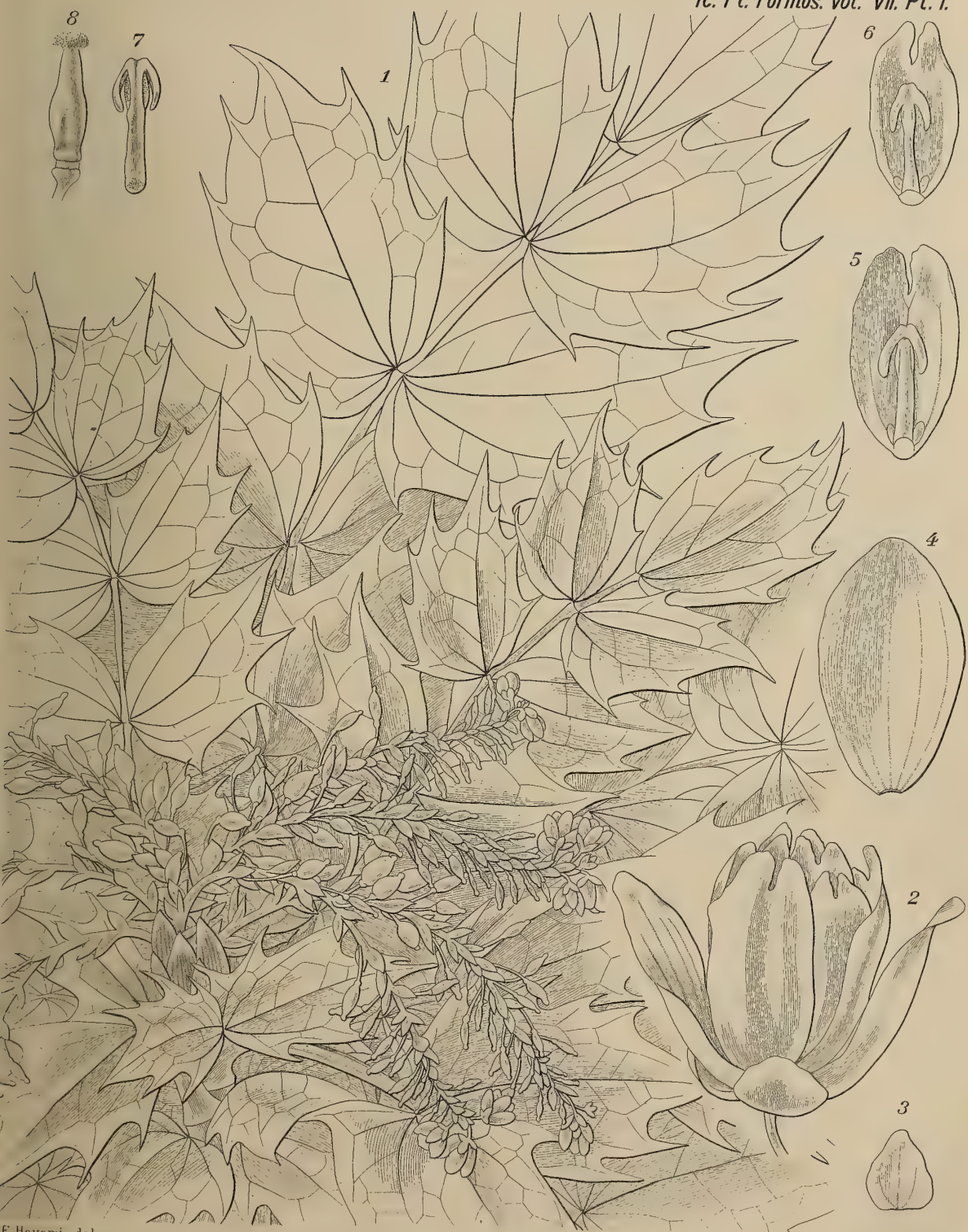
VII.

PLATE I.

Explanation of Pl. I.

Mahonia tikushiensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. An outer sepal.
4. An inner sepal.
5, 6. Petals.
7. A stamen.
8. A pistil.



ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE II.

Explanation of Pl. II.

Pittosporum daphniphylloides HAYATA.

- Fig. 1. A branch.
2. A flower.
3. A sepal.
4. A petal.
5, 6. Stamens, seen from different sides.
7. Ovary.
8. A seed-bearing carpel.
9. A seed.



ICONES PLANTARUM FORMOSANARUM.

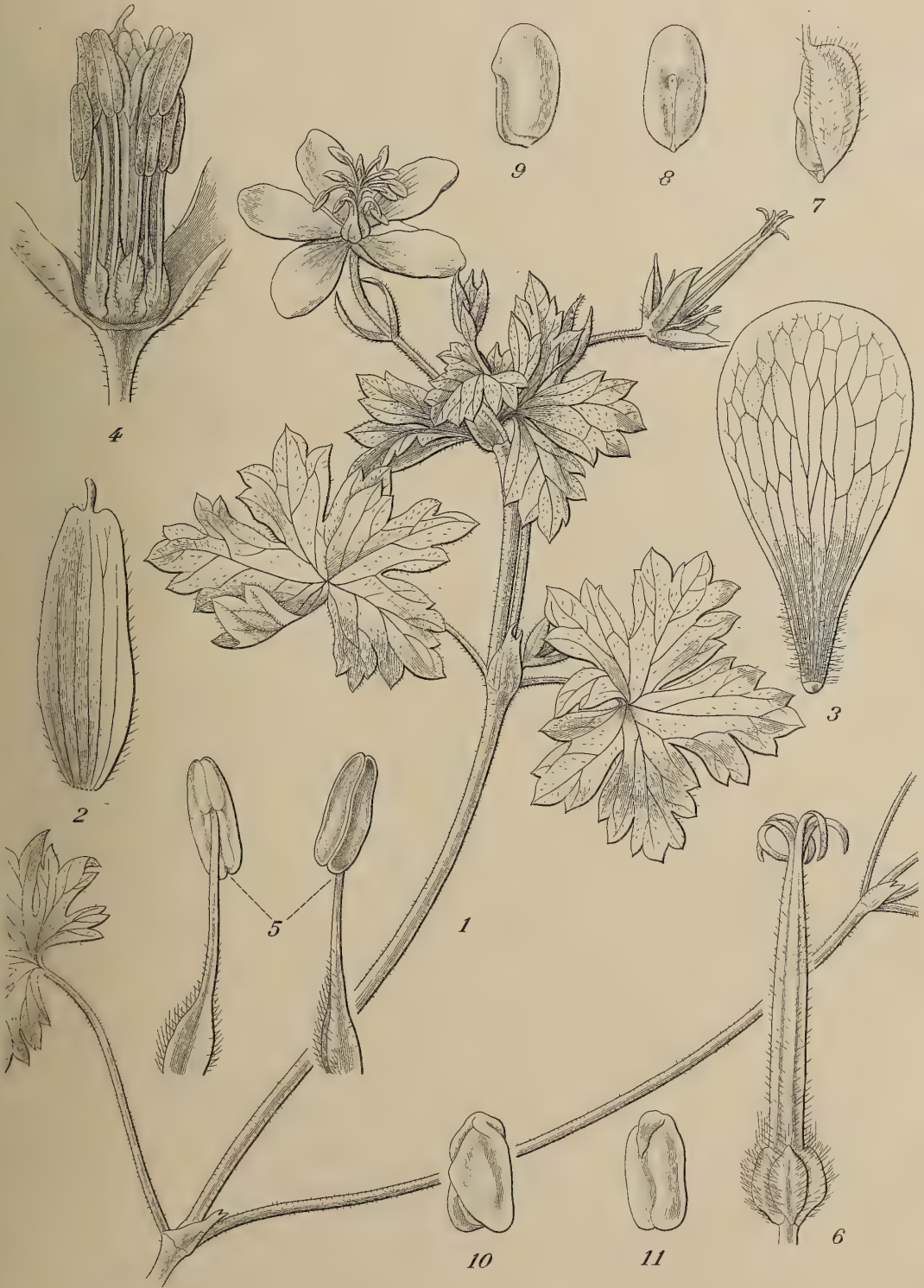
VII.

PLATE III.

Explanation of Pl. III.

Geranium uniflorum HAYATA.

- Fig. 1. The plant.
2. A sepal } seen from within.
3. A petal.
4. Stamens on the receptacle.
5. Stamens.
6. A pistil.
7. A carpel with a seed.
- 8, 9. Seeds, seen from different sides.
- 10, 11. Embryos, seen from different sides.



ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE IV.

Explanation of Pl. IV.

Photinia daphniphylloides HAYATA.

- Fig. 1. A branch.
2. A flower.
3. A petal.
4. Portion of calyx, showing the insertion of stamens.
5, 6. Stamens, seen from different sides.
7. A flower-bud, petals taken off.
8. The same, in section.
9. Section of the ovary.



ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE V.

Explanation of Pl. V.

Abelia ionandra HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A flower.
4. Corolla, expanded.
5. Calyx with calyx-lobes.
6. Stamens.
7. Stigma.



ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE VI.

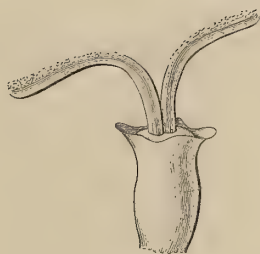
Explanation of Pl. VI.

Nertera nigricarpa HAYATA.

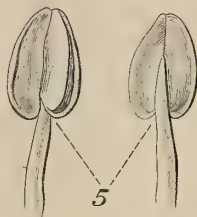
- Fig. 1. The plant.
2. A leaf.
3. A flower.
4. Corolla, expanded.
5. Stamens.
6. Ovary.



3



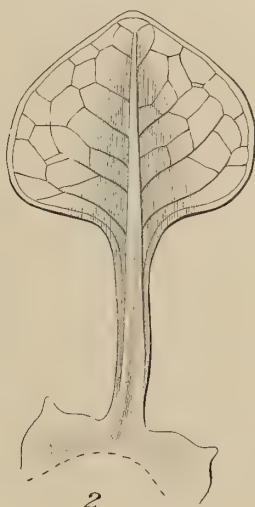
6



5



4



2



1

ICONES PLANTARUM FORMOSANARUM.

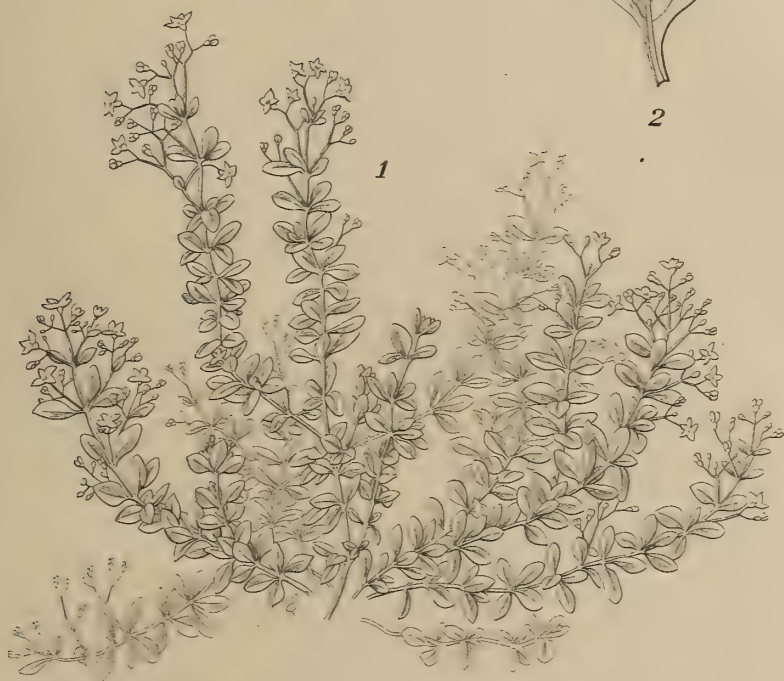
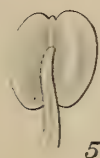
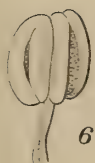
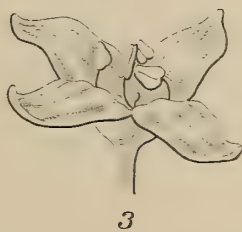
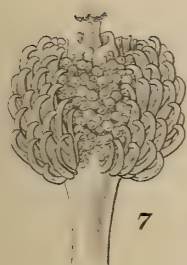
VII.

PLATE VII.

Explanation of Pl. VII.

Galium tarokoense HAYATA.

- Fig. 1. The plants.
2. A leaf.
3. A flower.
4. Corolla expanded.
5, 6. Stamens.
7. A young fruit.



ICONES PLANTARUM FORMOSANARUM

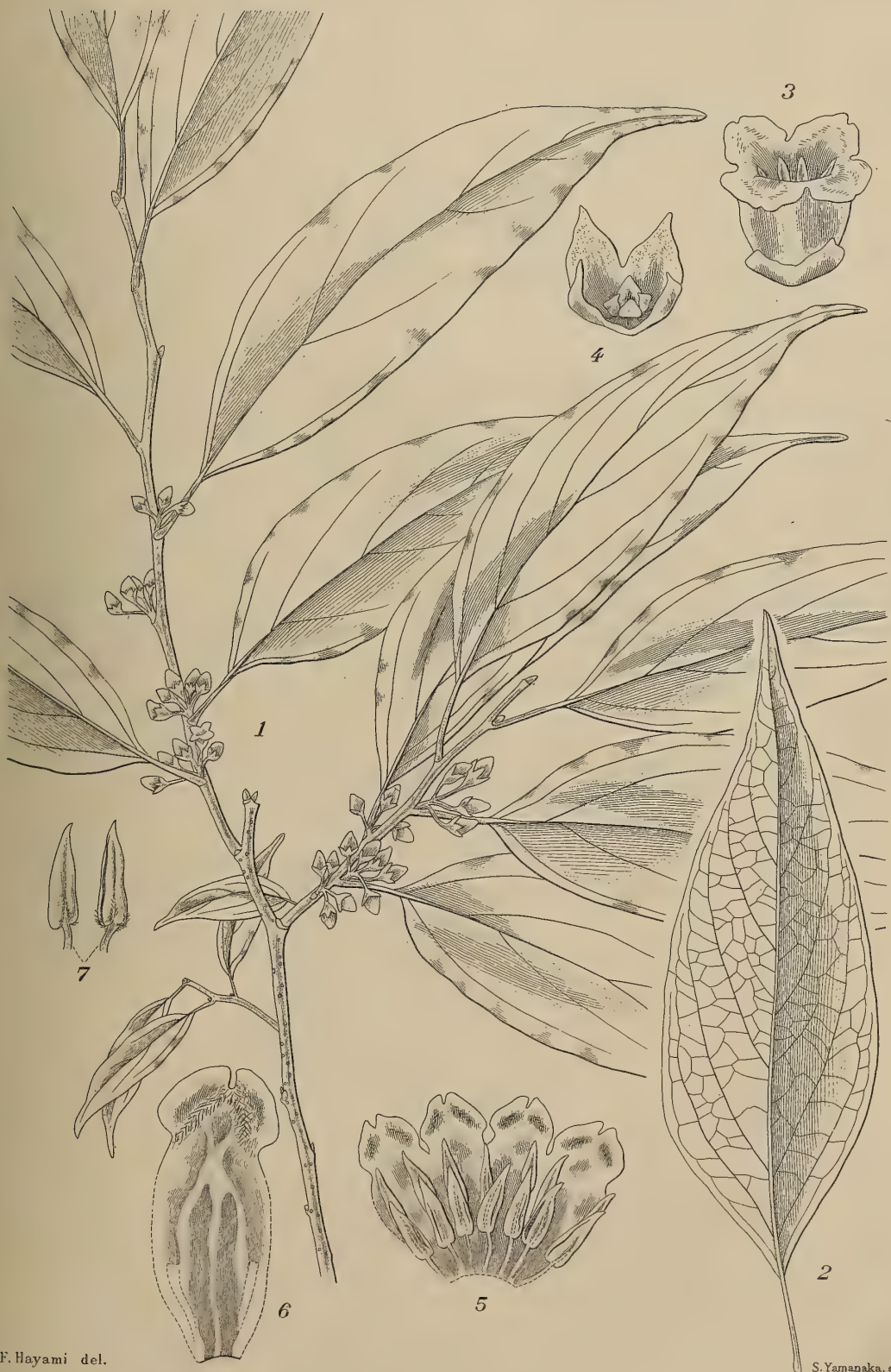
VII.

PLATE VIII.

Explanation of Pl. VIII.

Diospyros Sasakii HAYATA.

- Fig. 1. A branch.
2. A leaf.
3. A male flower.
4. Calyx.
5. Corolla, expanded.
6. A portion of the corolla.
7. Stamens.



ICONES PLANTARUM FORMOSANARUM.

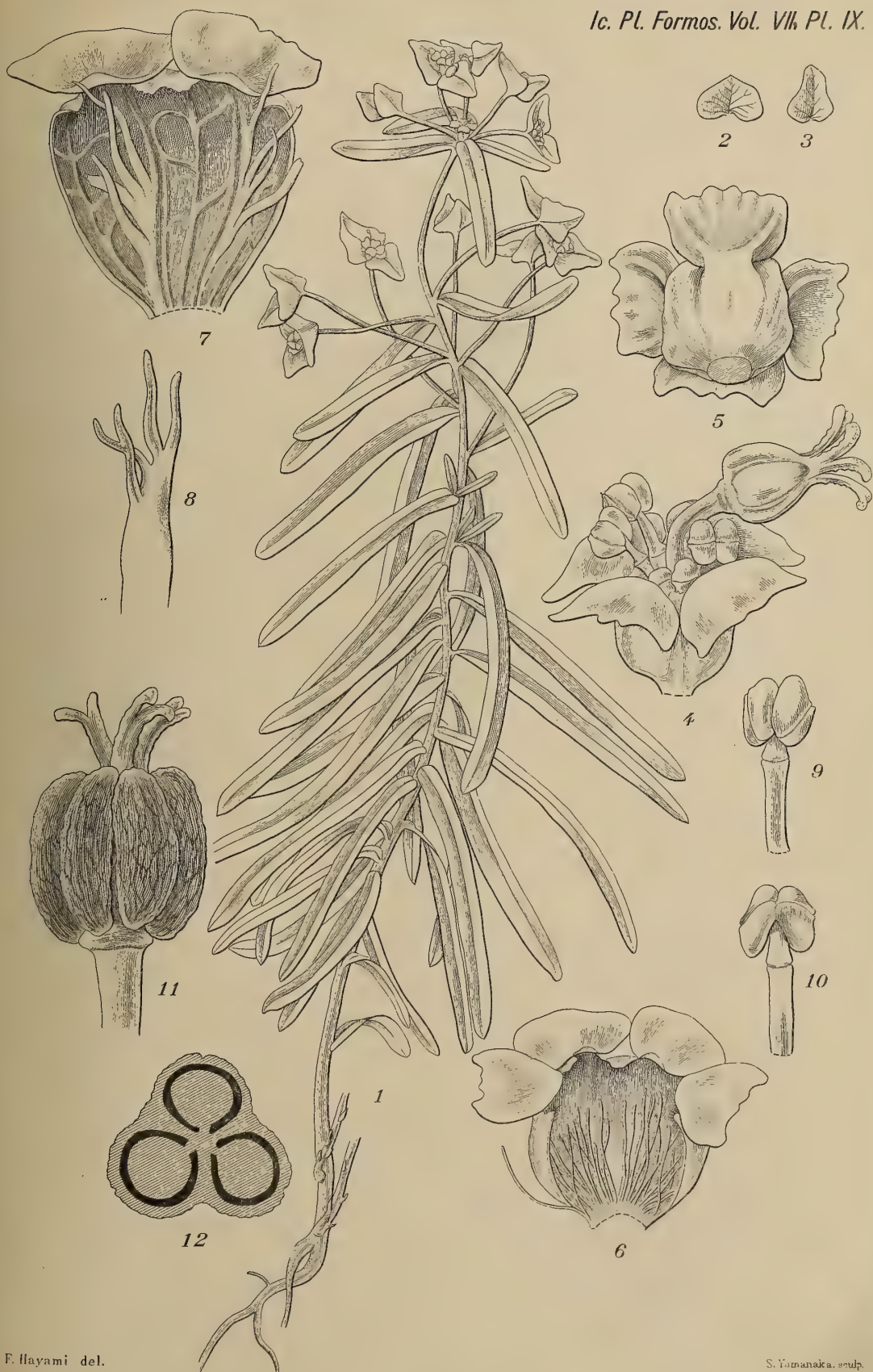
VII.

PLATE IX.

Explanation of Pl. IX.

Euphorbia tarokoensis HAYATA.

- Fig. 1. The plant.
2, 3. Floral leaves.
4. An involucre.
5. The same, seen from a different side.
6. The same, expanded.
7. A portion of the same.
8. A bract in the involucre.
9, 10. Male flowers.
11. A young fruit.
12. Section of the same.



ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE X.

Explanation of Pl. X.

Quercus Sasakii KANEHIRA.

- Fig. 1. A branch.
2. A leaf.
3, 4, 5. Glans, seen from different sides.



ICONES PLANTARUM FORMOSANARUM.

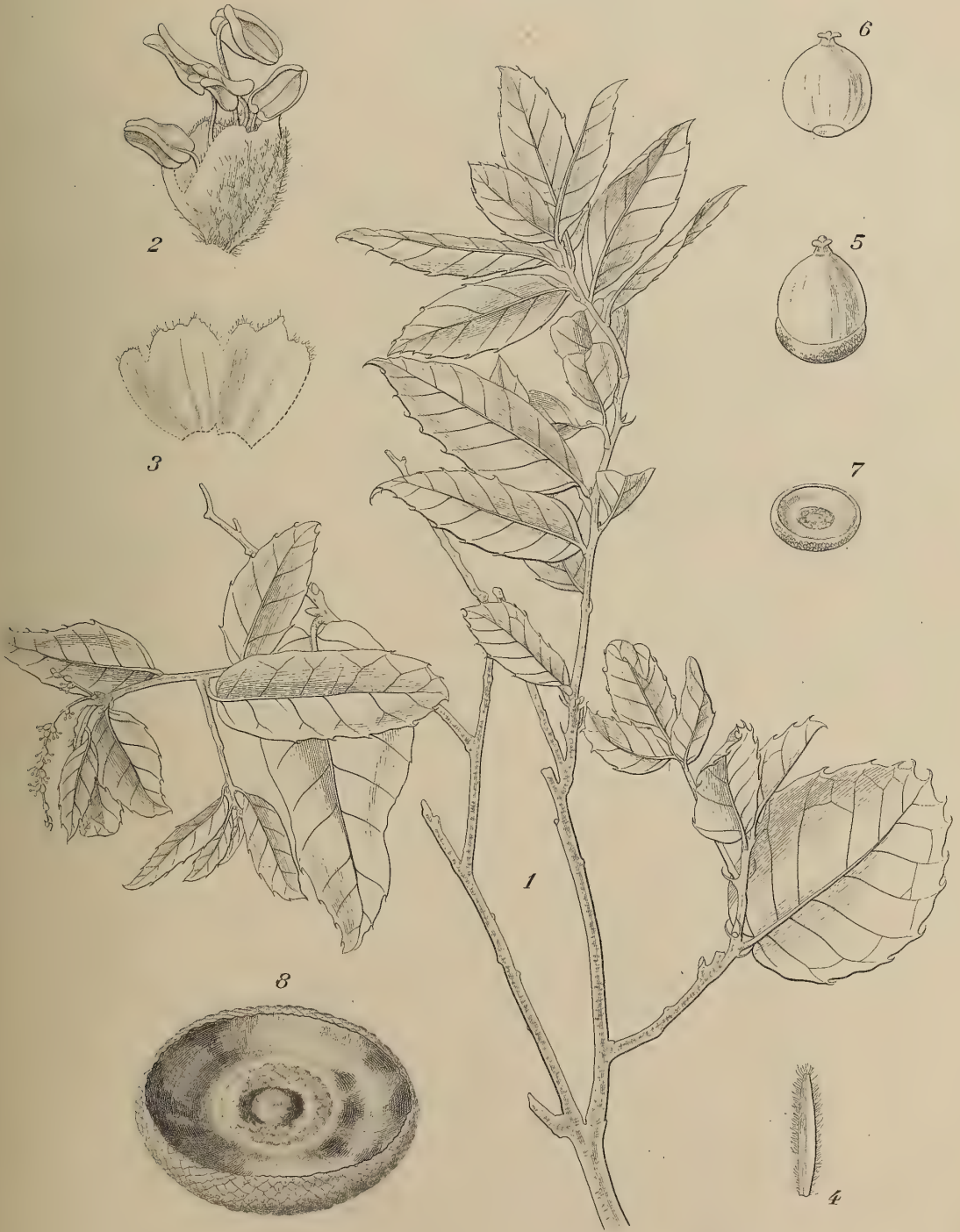
VII.

PLATE XI.

Explanation of Pl. XI.

Quercus tarokoensis HAYATA.

- Fig. 1. A branch.
2. A male flower.
3. Perianth, expanded.
4. A bract.
5. A fruit.
6. A glans.
7. A cup.
8. The same cup, magnified.



ICONES PLANTARUM FORMOSANARUM.

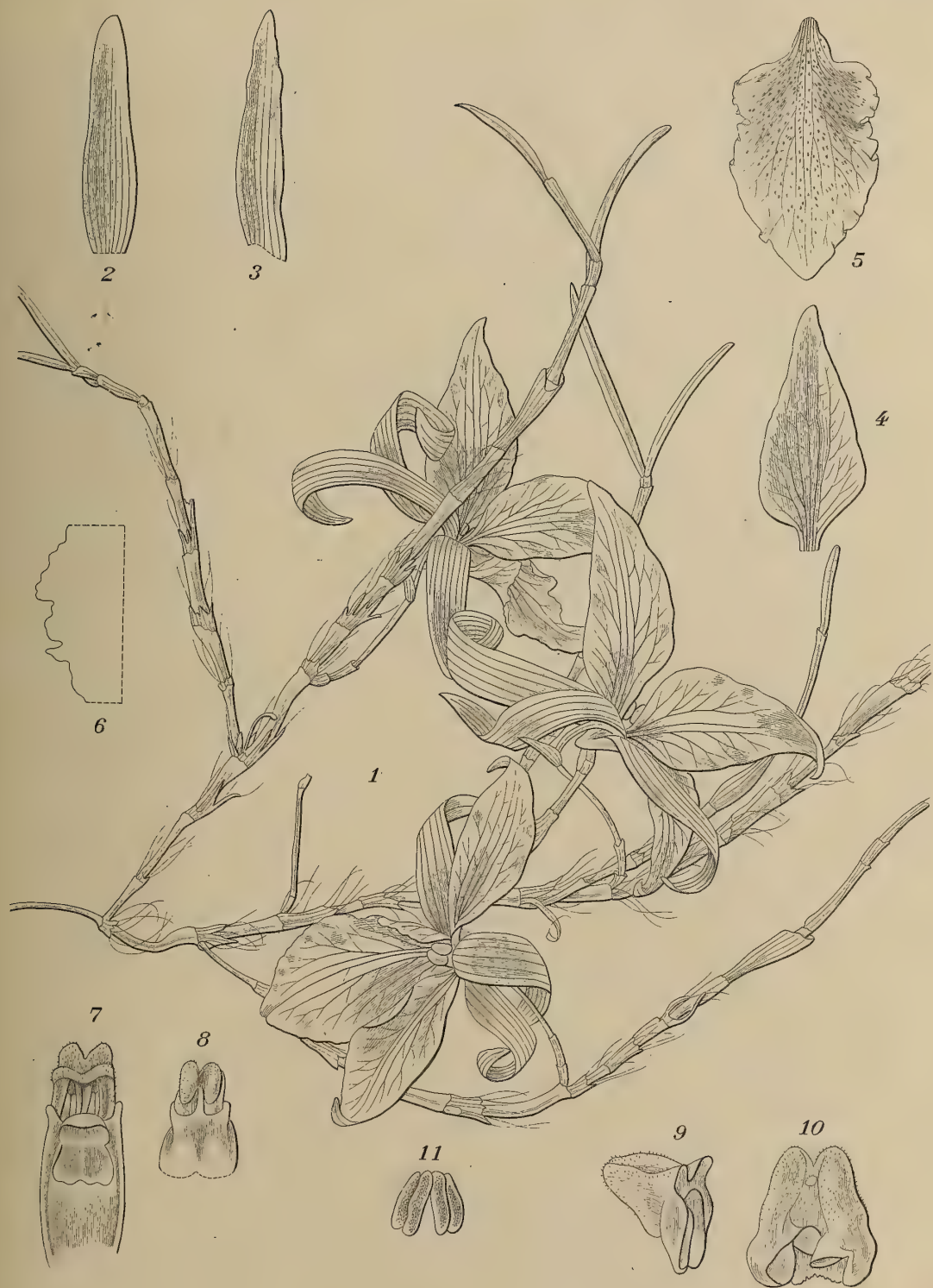
VII.

PLATE XII.

Explanation of Pl. XII.

Dendrobium erythroglossum HAYATA.

- Fig. 1. The plant.
2. A dorsal sepal.
3. A lateral sepal.
4. A petal.
5. A labellum.
6. Margin of the labellum.
7. Column.
8. Apical portion of the same, seen from back.
9. Operculum, seen from side.
10. The same, seen from back.
11. Pollinia.



F. Hayami del.

Lendrobium erythroglossum Hageata

S. Yamanaka. sculp.

ICONES PLANTARUM FORMOSANARUM.

VII.

PLATE XIII.

Explanation of Pl. XIII.

Liparis keitaoensis HAYATA.

- Fig. 1. The plant.
2. A flower.
3. A dorsal sepal.
4. A lateral sepal.
5. A petal.
6. A lip.
7. Column.
8. The same, seen from side.
9. An operculum and pollinia.



F. Hayami del.

S. Yamanaka. sculp.

Liparis Keitaoensis Hayata

ICONES PLANTARUM FORMOSANARUM.

VII.

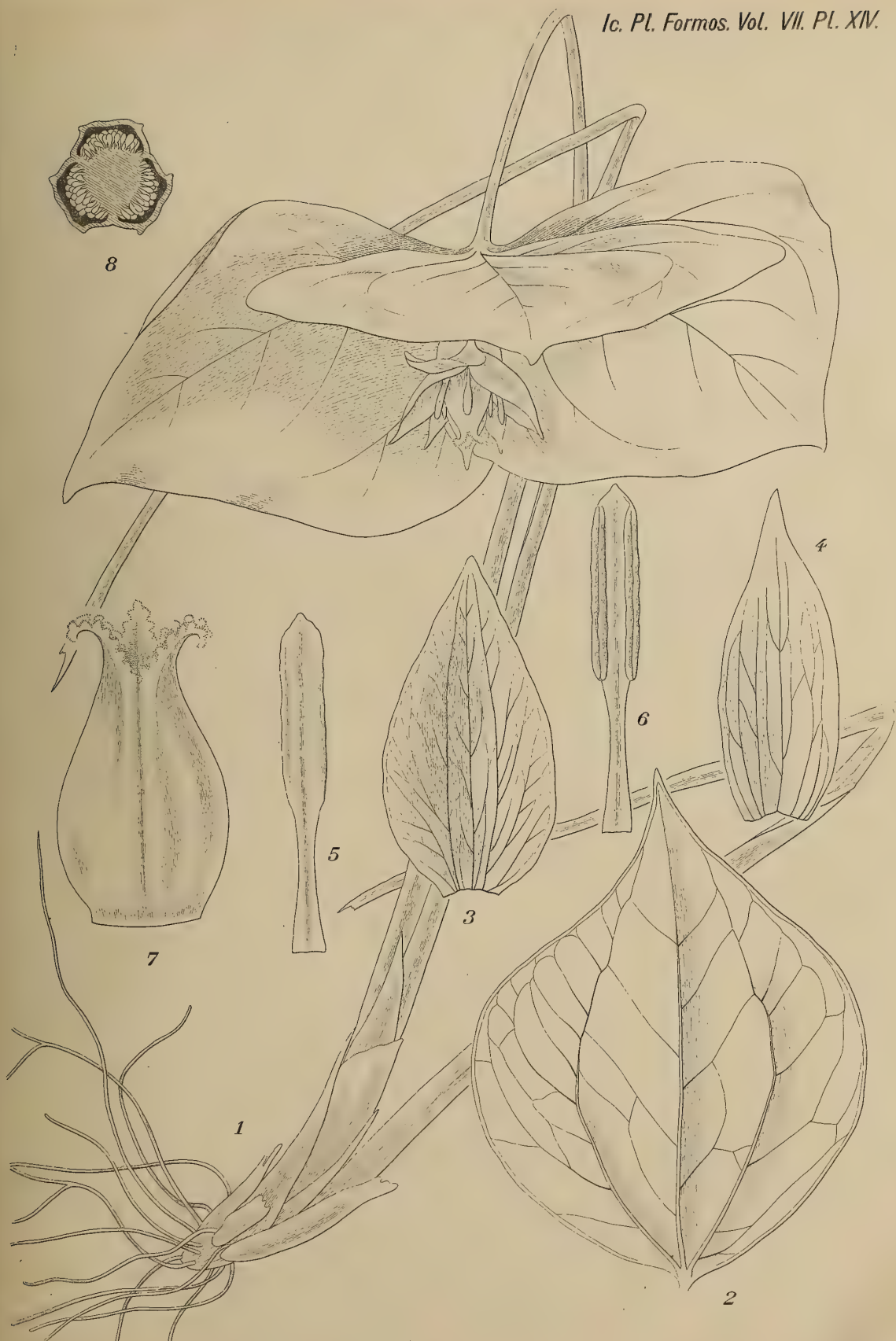
PLATE XIV.

Explanation of Pl. XIV.

Trillium Morii HAYATA.

- Fig. 1. The plant.
2. A leaf.
3. A sepal.
4. A petal.
5, 6. A stamen, seen from different sides.
7. Ovary.
8. The same in section.

Fig. 1 and 2, natural size ; others more or less magnified.



大正七年三月二十五日印刷

大正七年三月三十日發行

編輯兼發行者

臺灣總督府民政部殖產局

印刷者

井 上 源 之 丞

東京市下谷區二長町壹番地

印刷所

東京市本所區番場町四番地

出版印刷株式會社本所分工場

QK
369
H3
v.6-7

Hayata, Bunzō
Icones plantarum
Formosanarum

Biological
& Medical

PLEASE DO NOT REMOVE
CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY
